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An education evaluation program was begun in 1950: (1) to compare school achievement of Indian and white children in small, rural schools, grades 4 through 12, and (2) to establish a predictive testing program to aid in meeting the requirements for granting educational loans to Indian pupils. By 1955, California Achievement Tests had been administered to 23,608 pupils (58 percent of whom were Indian) attending Federal, public, and mission schools in 11 States. Results were compared by administrative areas of the BIA, by race-school groups, and by skill achievement. The results indicated that, in general, Indian pupils did not achieve as well as white pupils. The second activity of the program was the development of a battery of 5 tests, which by 1955 had been administered to 2,221 Indian college and business school applicants. Test results and performance data from the validation subjects were used to construct pass-fail expectancy tables for use in predicting college and business school performance. (JAM)

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THE INDIAN CHILD GOES TO SCHOOL

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A Study of Interracial Differences

COOMBS--KRON--COLLISTER--ANDERSON

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

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The Indian Child Goes To School

A Study of
Interracial Differences

by

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BUREAU OF INDIAN AFFAIRS
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Literally hundreds of public, mission, and Federal school administrators and teachers helped conduct this study. It is not practicable to name them all and the authors have no desire to name some and leave out others. To each of them, however, the authors express their heartfelt thanks for their splendid help in a cooperative endeavor.

Thanks are extended, too, to the thousands of boys and girls who took the tests and supplied background information about themselves. Undoubtedly they felt that taking the tests was a part of their regular school work, which it was, but their efforts were indispensable to the study. It is hoped that they did not find the task too onerous. May each of them feel in future years that American schools have served them well.

Special and sincere gratitude is expressed to the following two persons: Omer J. Rupiper who as Research Fellow during the 1955-56 school year efficiently handled the statistical processing of the data and assisted with the interpretation of it, and Patricia J. Anderson who cheerfully typed hundreds of pages of manuscript and prepared the Tables, Figures, and Appendices for offset printing.

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FOREWORD

The **Indian Child Goes To School** is essentially a report of the school achievement of Indian children as compared with that of their white schoolmates or neighbors. It is not primarily a study of individual achievement, but is rather a comparison of the average achievement of groups of pupils as measured by a standardized test of the basic skills taught in schools.

This study, under the guidance of the Bureau of Indian Affairs and the University of Kansas, was made possible by the joint efforts of many people. Tests were administered to 23,608 pupils attending Federal, public, and mission schools in eleven States. Of the children tested, 42 percent were white.

One of the aims of this study was to find what relationship exists between the academic achievement of Indian children and certain environmental factors, such as the language spoken in the home or the location of the home (whether on or off reservation). In general it shows that Indian pupils do not achieve as well in the basic skill subjects as do white pupils. When race-school groups were compared on the basis of achievement, the following order resulted:

1. White pupils in public schools
2. Indian pupils in public schools
3. Indian pupils in Federal schools
4. Indian pupils in mission schools.

A strikingly consistent coincidence resulted when the same groups were ranked on the bases of degree of Indian blood and pre-school language. With few exceptions, the higher ranking groups had less Indian blood and spoke more English before entering school. The lower ranking groups had more Indian blood and spoke less English before entering school.

The investigators have expressed the opinion that blood quantum and pre-school language are not in themselves controlling determiners of school achievement. They have referred to them as two of the best "indices of acculturation." If they are right, then the implication is clear that lack of "acculturation" is one of the main stumbling blocks to satisfactory school achievement by Indian pupils. The writers readily agree that the school itself is one of the "foremost acculturative agencies of society," but they point out that the school cannot do the job alone or at least not as rapidly as most persons would like to see it done.

Perhaps the time is long overdue when we need to cease generalizing about such broad, and sometimes vague, concepts as "acculturation" and begin to spell out with teachers, and in turn with Indian parents and community members, the specific things which they need to do if Indian children are to stand on an equal footing with their white neighbors in their school work.

Hildegard Thompson
Chief, Branch of Education

PREFACE

In 1928 the celebrated Meriam Report, entitled **The Problem of Indian Administration,** was published. It was the report of a survey conducted by The Institute of Government Research, sometimes called The Brookings Institute, at the request of the Honorable Hubert Work, then Secretary of the Interior. The survey staff was composed of ten persons and was headed by Lewis Meriam, the technical director. Over a period of seven months this staff scrutinized closely all of the activities of the Bureau of Indian Affairs spending most of their time in the field and visiting many Indian reservations and installations of the Bureau. Another nine months were spent in the preparation of their report. In view of the fact that it was published twenty-eight years ago, as this is written, it is probable that relatively few persons now employed by the Bureau have ever read the report. One can judge that, at the time of its publication, it made a terrific impact upon the thinking of people concerned with Indian affairs, both in the Bureau and out. Educational workers or others concerned with the education of Indian children might read the section on education with great profit, even today. The freshness and present-day validity of the philosophy and theory of education expressed therein are remarkable. It was written by Dr. W. Carson Ryan, Jr., who was a member of the survey staff and who later served as Director of Education for the Bureau for five years.

The report was severely critical of both the educational philosophy of the Division of Education and the program of education it was offering Indian children. It stated that the Bureau was starving for lack of funds, had incredibly low standards, and was afflicted with a stodgy concept of education, lagging far behind the best theory and practice of the times. There is no intent here to imply that the criticism was not merited—undoubtedly it was. The thing that is more than a little surprising to the writers is that apparently there has never been a comprehensive, well documented accounting, point by point, of the reforms and improvements that have been brought about under the prodding of the Meriam Report. Any person at all well informed about the course of Indian education during the past 28 years knows that these changes have been both extensive and profound.

It is true that Education Brarch of the Bureau in recent years has not been inarticulate about its program. Near the beginning of his fifteen-year tenure as Director of Education, Willard W. Beattty, to use his own words, "launched a fortnightly field letter addressed to every employee and designed to present clearcut statements of philosophy, policy, and preferred procedure: **Indian Education.**" In 1944 selected articles from **Indian Education** for the years 1936-43, written by Beatty and his associates, were gathered together in a volume called **Education for Action.** A companion volume for the years 1944-51, called **Education for Cultural Change,** appeared in 1953.

In 1949 the late Homer H. Howard, Supervisor of In-Service Training presented the volume, **In Step with the States,** a comparison of State and Indian Service educational objectives and methods. The title itself indicates the gist of the content.

During the years since 1928 there has been a flow of specially prepared teaching materials and **Minimum Essential Goals** of education, painstakingly and cooperatively hammered out by Bureau educators in summer sessions and workshops, to meet the particular needs of Indian boys and girls. These have been designed primarily as working tools for Bureau teachers but other schools have always been free to borrow from them.

The Meriam survey team had a minimum of objective data available for its use; at least as far as the educational program was concerned. It simply observed the program of education as it was being carried out and compared it with what were accepted as the better prevailing educational practices of the time. There is no quarrel with their method. As is pointed out in this report, this approach to evaluating the quality of a school or a school system is a perfectly valid one. By 1944, however, the Bureau wished to know the facts about the learning of Indian children. How did their educational achievement compare with that of white children? How did the achievement of Indian pupils in Bureau schools compare with that of Indian children in public and mission schools? How did Indian children in boarding schools compare with those in day schools? What were some of the factors which influenced the learning of Indian children? These and other questions were raised. Answers to them were offered in the monograph, **How Well Are Indian Children Educated?**, by Dr. Shailer Peterson of the University of Chicago. This was a report of a three-year study conducted jointly by the Bureau and the University of Chicago and appeared in 1948.

In 1953 the monograph, **The Educational Achievement of Indian Children**, by Dr. Kenneth E. Anderson and his associates at the University of Kansas was published. This volume reported on a follow-up study conducted cooperatively by the Bureau and the University of Kansas in the spring of 1950. It investigated any changes which might have occurred in the educational achievement of Indian children since 1946, the last year of the Peterson survey. In general, Anderson's findings supported those of Peterson. In addition he contributed new techniques for the interpretation of test data.

The present study is along the lines of those of Peterson and Anderson. It has drawn from them and is indebted to them. Nevertheless, it can perhaps claim some distinctions of its own. The planning and execution of the testing programs in the several areas were painstaking and well supervised. In addition, many more pupils were included in the present study than in either of the earlier ones. From the outset much stress was placed upon making test results serve the needs of individual pupils, teachers, and schools as is reflected in Chapters VII and VIII. And, above all, the writers have been rather bold in expressing conclusions and points of view—not, it is hoped, without supporting data. If, in this transitional period when Indian children are transferring to the public schools in increasing numbers, some of the old misconceptions and "folklore" surrounding the learning problems of Indian children have been dispelled, some good has been accomplished.

The writers cannot resist a quotation from the Meriam Report. As of 1928 it said, "In the Indian schools not even the most elementary use has as yet been made of either intelligence testing or objective tests of achievement in the types of knowledge and skills that are usually referred to as the 'regular school subjects'." And again, "Almost the only use made of achievement tests with Indian children is found in public schools............ A practical way to improve this situation, apart from encouraging attendance upon summer sessions and visits to other schools, would be to develop close relations between Indian schools and nearby universities........" Finally, "A staff person at Washington familiar with measurement procedure could straighten out this testing business and direct considerable valuable work in the schools by teachers and other workers." For the past ten years the Bureau of Indian Affairs has made a determined effort to act upon these recommendations.

L. Madison Coombs

CHAPTER 1

WHAT THE STUDY DISCLOSED—A SUMMARY

This is a report on Indian school children; their school achievement, and some of the cultural and environmental factors related to it. Herein Indian children are studied by comparison with their white schoolmates and neighbors. Each succeeding year finds a greater proportion of Indian children attending the public schools of the States in which they reside, as arrangements are concluded between the Federal government and the several States and local school districts.

There are probably few dissenters from the general policy behind this trend. The education of children has traditionally been a function of State and local governmental units in America. And most persons would agree in principle that the children of Indian American citizens should have the opportunity of attending the public schools.

A large number of Indian children (approximately 10,500 in 1956) chose to attend schools maintained by the various religious denominations. This, too, is their established American right. From the earliest days the mission schools have made a signal contribution to the education of Indian youth.

It would be idle and less than honest, however, to pretend that the transition from Federal to State and local responsibility is being, or can be, brought about without certain strains and tensions. Some of these revolve around the question of the financial support of schools. Some are concerned with the matter of **timing** the transfer of Indian pupils to public schools; opinions vary from those who would effect the tranfer, completely and immediately, to those who would postpone it indefinitely. Sometimes disagreements arise as to which type of school is doing the "better job." Usually such controversies "generate more heat than light." Amidst this welter of conflicting opinion, what of the Indian child himself? What are the facts about his school achievement, particularly as compared with that of his white neighbors? What are some of the facts about his language background, his age in relation to his grade, his attendance, his friends, and his aspiration for further schooling? What difference does it make in his learning whether he lives on a reservation rather than **off**, or in a town rather than in the country?

It is the earnest hope of the writers that this report will help to put the problem in perspective—will substitute fact for fancy, and lead to a sounder understanding of the influences which affect the learning of Indian boys and girls.

GROUPS, AS WELL AS INDIVIDUALS, DIFFER

During the past several decades, teachers have become more and more aware of the differences between individual children and have tried to adjust their teaching to accommodate these differences. Professional educators have had less occasion, however, to understand the cultural differences which characterize whole groups of pupils and affect their learning in school. Often, in local school systems, it has seemed impolitic to raise such questions for fear of being misunderstood. The present study admits and discusses such cultural differences frankly; no good purpose is likely to be served by pretending that they do not exist. The fact that they do exist does not necessarily reflect discredit on anyone. But if such cultural differences adversely affect learning we need to know what they are and how large they are so that we can ameliorate the effects or at least understand them.

THE STUDY WAS A COOPERATIVE EFFORT

This study came about through the joint efforts of a great many people. The Bureau of Indian Affairs and the University of Kansas guided the study but it was made possible only by the generous and interested help of hundreds of workers in public and mission, as well as Federal, schools.

WHO WERE THE PUPILS?

Information was gathered on a total of 23,608 pupils. Fifty-eight percent of these pupils were Indian and forty-two percent of them were white. Of the Indian pupils, 8,564 or 62.6 percent were attending Federal schools; 3,144 or 23 percent were attending public schools; and 1,978 or 14.5 percent were attending mission schools. Of the white pupils, 9,353 or 94.3 percent were attending public schools. A scattered few were attending mission schools or community schools operated by the Bureau of Indian Affairs and are not treated in this study.

WHERE DID THEY LIVE OR GO TO SCHOOL?

The children lived or went to school in the following States: Arizona, New Mexico, Colorado, North Dakota, South Dakota, Nebraska, Montana, Wyoming, Oklahoma, Mississippi, and Kansas. The great majority of them attended schools in the communities in which they lived, but a few of them who attended boarding schools lived in other communities or even other States. They were virtually all rural children in that the study was confined generally to communities of 2,500 population or less, except for a few of the non-reservation boarding schools. Even in these schools the great majority of the pupils came from rural homes. The public schools which participated were located close by the Federal and mission day schools and reservation boarding schools and enrolled a considerable number of Indian pupils as well as white pupils.

THE GROUPING OF PUPILS FOR THE STUDY

For purposes of making comparisons, the pupils were grouped at various times in the following ways:

(a) By administrative areas of the Bureau of Indian Affairs. These areas were: Albuquerque (New Mexico and Colorado); Phoenix (Arizona); Aberdeen (North Dakota, South Dakota, and Nebraska); Billings (Montana and Wyoming); Muskogee (Eastern Oklahoma and Mississippi); Anadarko (Western Oklahoma and Kansas).

(b) By school grades. All pupils in grades four through twelve were included.

(c) By race and type of school attended. Thus there were four such groups: white pupils in public schools; Indian pupils in Federal schools; Indian pupils in public schools; Indian pupils in mission schools.

(d) In relation to certain cultural and environmental factors as will appear later.

TRIBES AND SCHOOLS FROM WHICH THE PUPILS CAME

Most of the tribes represented are mentioned in Chapter III. There were no Navajo or Hopi included since these tribes were under the jurisdiction of another area office. A list of the schools which participated is shown in Appendix A. In all there were 319 of them and they are shown by administrative types.

THE TEST USED AND WHY

The pupils were all given the complete battery of the California Achievement Tests. This battery measures achievement or learning in what are commonly called the basic skills: reading vocabulary, reading comprehension, arithmetic reasoning, arithmetic fundamentals, mechanics of English and grammar, and spelling; when put together these yield a total score.

It must be made clear that limiting the testing to such highly academic areas of learning does not imply a reaction or retreat by the Bureau of Indian Affairs from its long established conviction that Indian children need to be taught functional social and vocational skills—far from it. The teaching of these latter skills continues without loss of emphasis in the schools operated by the Bureau. But the basic skill subjects have always been taught in Bureau schools also. It was recognized in the present study that these basic skills are the fundamental tools which pupils must have in order to acquire most other learnings satisfactorily. Most important of all, the basic skill subjects represented an area of similarity and agreement among the three administrative types of schools; all taught them and would agree that they were indispensable.

It is clear, then, that when we speak of school achievement we are referring to the basic skills mentioned—nothing more. And we are not implying that these skills are more important than other educational goals which the schools may have set—that is a matter of educational philosophy into which we will not enter. We simply assume that these skills do represent highly important goals for all the schools concerned.

A COMPARISON OF ACHIEVEMENT BY ADMINISTRATIVE AREAS

It was expected that differences in achievement would occur among groups of pupils of different races attending different types of schools. This proved to be true as we shall see presently. It may be more surprising to many readers to learn that achievement among the several areas differed widely and significantly, even though the pupils of both races and all three types of schools were grouped together in each of the areas.

As is described in Chapter III, a general hierarchy or order of achievement of the areas was established. This hierarchy proved to be as follows: 1. Anadarko, 2. Billings, 3. Aberdeen, 4. Muskogee, 5. Albuquerque, 6. Phoenix. Except as between Anadarko and Billings, all the differences were statistically significant. Thus, with the exception mentioned above, the hierarchy is quite clear-cut.

One can scarcely observe such sectional differences without becoming curious as to the reasons which lie behind them; and the reasons are indeed hard to define. It is easy enough to say that these area groups differed from each other culturally. It can be shown that a much greater infusion of white blood has occurred among Indian groups in some areas than in others, and that much more English is spoken by the Indians of some areas than by those of others. But how, for example, does one explain the fact that the **white** pupils tested in the Dakotas achieved higher at every grade level than the white pupils tested in eastern Oklahoma? An insignificant proportion of either group spoke any language other than English. Without any desire to wound local or sectional pride, it seems fair to surmise that some subtle socio-economic or cultural influences are operating here to cause such differences. It must be quickly and forcefully pointed out that the findings of this study do not purport to be characteristic of **all** the pupils of an area, but rather of the rural pupils tested in the vicinities where the Federal government operates Indian schools.

The differences in average level of achievement among the areas had been noticed since the beginning of the testing program in 1951 and led to the decision to establish a separate set of norms for each area.

It had also been observed in the first areas tested that, whereas the mean scores of the area groups were close to the published norms of the California Achievement Tests at grades four and five, they tended to fall progressively farther below the "national" norms as the higher grades were reached. This phenomenon has characterized the scores of every area group in the study. It has been particularly true of the Indian groups but has tended to be true of most of the white groups as well. Numerous explanations of this phenomenon have been offered by teachers whose opinions have been solicited. It has been suggested that because many Federal schools stress vocational training in the upper grades, instruction in the basic skills is slighted. This, if true, would not explain why the same thing tends to happen to most of the mission school Indian groups and to white public school pupils, particularly in the Albuquerque and Muskogee Areas. It has even been claimed that teaching is generally of a better quality in the elementary grades than at the intermediate and high school levels. Again, if this were so, there is no evidence that it is any more true of the schools participating in this study than of those upon whose pupils the "national" norms were based.

It has been observed that in the higher grades it becomes increasingly difficult to motivate poorly acculturated pupils to an academic type of study. The immediate needs of their lives do not seem to require it and it is difficult for them to envision a long-range need which **might** or could occur later in life and in a different socio-economic setting. Herein may lie an answer for those persons who marvel that so few Indian young people, relatively, enter the professions.

One astute and thoughtful teacher has commented that in the elementary grades nearly all learning experiences center around **life** experiences which most children hold in common—home, family, the community, and the natural things which surround them. As learning moves into more abstract areas or experiences farther removed from the daily life of the child, the underacculturated home and community contributes less and less help to the learning process.

Whenever one makes comparisons between groups in terms of the "average," he is faced with the ever-present facts of "range" and of "overlap" and must not ignore them. Within each of the area groups there was a large range of achievement, with some individuals in even the lowest achieving area making higher scores than some of the pupils in the highest achieving area. Furthermore this range of achievement becomes greater the higher we go in the grades. Twelfth-grade pupils, as a whole, are less similar in achievement than are fourth-grade pupils.

A COMPARISON OF ACHIEVEMENT BY RACE-SCHOOL GROUPS

As was indicated earlier in this chapter, there were differences in average achievement among groups of pupils of different races attending different types of schools. These groups were then arranged into a hierarchy or order of achievement as was done for the area groups. The following clear-cut general hierarchy emerged:

1. White pupils in public schools
2. Indian pupils in public schools
3. Indian pupils in Federal schools
4. Indian pupils in mission schools

There were two exceptions to this order. In the Aberdeen Area the mission school Indian pupils were tied with the public school Indian pupils for the second and third positions; in the Albuquerque Area the Federal school Indian pupils were in the second position and the public school Indian pupils and the mission school Indian pupils were tied for the third and fourth positions. There were no mission school pupils in the Anadarko and Muskogee Areas.

There is a popular off-hand assumption that the quality of a school can be determined by the amount its pupils learn in a given period of time, by comparison with other pupils and other schools. This assumption is both persistent and pervasive. It is indulged in not only by the lay public but also by teachers who should know better. It is as though all pupils were considered to be equally blank and equally impressionable sheets of paper which are sent to school and upon which no one is ever permitted to mark except the school itself. If such were the case, the school should indeed be held entirely accountable for the amount and rate at which pupils learn, but the facts are something quite different. The facts are that children do not learn everything they know in school, although some are far more dependent upon the school than are others; they do not all **start even** in point of ability, or interest, or experience, or health; and they certainly do not **remain even** throughout their school careers in terms of **learning advantages** outside the school. Most persons know, of course, that this is true of individual pupils, but they forget sometimes that whole **groups** of pupils may be characterized by such differences.

It is not to be wondered at, then, that the white pupils in the study, as a group, consistently made higher scores than Indian pupils, considering the great cultural advantage they enjoyed with respect to such things as language, motivation, and out-of-school learning opportunities. Nor is it surprising that the Indian pupils who attended public schools achieved better on the average than Indian pupils who attended Federal and mission schools since culturally they were more advanced as later evidence will reveal.

There is no intent, of course, to try to minimize the school's role in the educative process. The school is the instrument which the community employs to give formal shape and direction to the education of its children. But it cannot and must not get too far out of joint with the community it serves and from which it receives its support. The school is a reflection of the community even while it seeks to lift the community gradually to a higher level. Its curriculum and the level of difficulty of its instructional program must suit the needs of the people it serves. The private preparatory schools of the East which specialize in preparing the students for Harvard, Yale, and Princeton, fine as they are, would not work on the Papago Reservation, for example, or in most of the strictly rural communities of America.

For these reasons it is true that schools differ in "quality" but communities usually get from their schools what they want and are willing or able to pay for. In the light of this, it behooves the Bureau of Indian Affairs to take a close look at each public school to which it may be contemplating the transfer of pupils, to be sure that the school is prepared to offer the Indian pupil what he needs and at a level at which he can function successfully.

A COMPARISON BASED ON THE SEVERAL SKILLS

We have seen that, on the average, the white pupils in the study achieved better on the tests than did the Indian pupils. The further question then arises of whether this superiority was equal for each of the several skills or whether the Indian pupils did better, by comparison with white pupils, on some skills than on others. This question is explored and discussed in Chapter V. Specifically the comparison was made between Indian pupils in Federal schools, and white pupils in public schools, these being the two largest race-school groups.

It was found that the Indian pupils compared best in spelling and least well in reading vocabulary. There was a wide difference between these two extremes, with the comparative achievement of the Indian pupils in spelling being significantly higher than for any of the other five skills. In reading vocabulary they were significantly lower than in reading comprehension, arthmetic fundamentals, and spelling.

By comparison, the Indian pupils were second highest in arithmetic fundamentals and second lowest in arithmetic reasoning. While the difference in their comparative standing on these two skills does not meet the requirement for "statistical" significance, it approaches it nearly enough to justify some comment.

It seems fair to point out that spelling and computational skills in arithmetic are probably learned, by most children, largely within the school and by a rote method. Word meanings, on the other hand, may be acquired by pupils in a wide variety of learning situations, outside the school as well as in. In other words, the pupil who is culturally disadvantaged in point of language or experience may suffer less by comparison with other pupils in the learning of skills over which the school has the greater control. Furthermore, in the particular spelling test under discussion, the pupil is asked to identify one misspelled word out of four words presented in each item. It is possible, although not proved, that a large percentage of Indian children have high aptitude for visualizing the form of words. If this is true they might be able to identify the misspelling of a word which they had previously seen spelled correctly, even though they did not know its meaning.

In addition, it was observed that the Indian pupils compared much more favorably with white pupils in the elementary grades, and particularly in grade four, than in the junior and senior high school grades. It was also noted that they compared most favorably with white pupils in the Muskogee and Albuquerque Areas and least well in the Aberdeen and Billings Areas.

THE RELATIONSHIP BETWEEN ACHIEVEMENT AND DEGREE OF INDIAN BLOOD AND PRE-SCHOOL LANGUAGE

The hierarchy of achievement by race-school groups has already been set forth. It has been suggested that this hierarchy is a result of basic cultural differences between the groups. What data can be adduced to support such an assumption? Investigation of the data reveals an amazingly consistent relationship between the degree of Indian blood and pre-school language on the one hand and level of achievement on the other. With only one notable exception, the smaller the amount of Indian blood in a group and the greater the amount of English spoken prior to school entrance, the higher the group achieved. Stating it another way, the higher achieving race-school groups contained fewer full-blood pupils and more pupils who spoke only English, or at least a combination of English and some other language, prior to school entrance. The single exception was in the Albuquerque Area where the Indian pupils in Federal schools, despite the fact that a higher percentage of them were full bloods and fewer of them spoke English before starting to school, achieved higher as a group than the Indian pupils in public school. In the Aberdeen Area, the Indian pupils in Federal schools achieved lower, as a group, than the Indian pupils in mission schools; however, consistent with the general rule, more of them were full bloods and fewer of them spoke English, pre-school.

The writers do not believe that blood quantum and pre-school language, of and by themselves, are strong determiners of achievement. They do believe that these characteristics are two of the best indices of the degree of acculturation of a pupil and that the stage of acculturation which a pupil and his family have reached has a powerful influence upon his school achievement. In Chapter VI the writers have been at some pains to describe what they mean by "acculturation."

It is noteworthy that, by and large, the Federal schools now remaining, together with the mission schools, are enrolling the least acculturated Indian pupils. This, no doubt, is as it should be. Special Federal schools can be justified only where educational opportunity for Indian pupils would otherwise be lacking or where Indian pupils, because they are disadvantaged, need special curricula, methods, and materials. Mission schools likewise have in most areas traditionally sought out pupils who stood in the greatest need of help. It would be manifestly unfair, however, to expect pupils who are at a relatively lower cultural level to achieve as well as those who enjoy much greater cultural advantages.

AGE OF PUPILS IN RELATION TO GRADE

Indian pupils are, on the average, older for their grade than white pupils. Again, there are differences among the several Indian groups. Indian pupils in Federal schools were, on the average, slightly more than one year older than white pupils in the same grade. Indian pupils in public schools averaged about six months older than their white classmates, while Indian pupils in mission schools were, in general, nearly a year older than white pupils of the same grade in the public schools.

The greatest over-ageness of Indian pupils in Federal schools occurred in the Phoenix and Muskogee Areas and the least in the Albuquerque Area. For Indian pupils in public schools it was greatest in the Aberdeen Area and least in the Anadarko Area. Indian mission school pupils were most over-age in the Phoenix Area and least so in the Aberdeen and Albuquerque Area.

It seems probable that the over-ageness of Indian pupils is accounted for not only by late school entrance, but also by the necessity for a beginning year for many of them in which basic social and conversational English skills are taught, and by the fact of irregularity of attendance.

OTHER OBSERVATIONS RELATED TO AGE-GRADE

In general the range of ages in a given grade was greatest for Indian pupils in Federal schools and least for white pupils in public schools. In general, too, the range of ages within a grade, regardless of the race-school group, lessened from grade four through grade twelve. It is believed that this is occasioned by the dropping out of school of over-age pupils. This belief, so far as it applies to Indian pupils, is supported by the fact that, except in the Albuquerque and Phoenix Areas, Indian and white pupils were more nearly the same age in grades eleven and twelve than was true for the earlier grades.

For the most part, the concentration of ages of white pupils in any given grade was in one or two years, whereas the concentration of ages of Indian pupils in Federal schools in a grade was usually in three or four different years.

Interestingly the preponderance of pupils, regardless of race-school groupings, who were over-age for their grade were boys and the majority of pupils who were under-age for their grade were girls.

THE RELATIONSHIP BETWEEN AGE IN GRADE AND ACHIEVEMENT

There is impressive evidence that on the average pupils who are over-age for their grade do not achieve nearly as well in the basic skill subjects as do those who are at-age or under-age. It must be noted, however, that many pupils who are classified as under-age in this study would not be considered so in most of the nation's schools, due to the higher average age of pupils in this study. It is also felt that over-ageness in itself is not the only contributor to the low achievement of over-age pupils, but that the same social, economic, and cultural factors which tended to make them over-age in the first place continue to operate against their learning.

THE HOLDING POWER OF THE SCHOOL

For a number of reasons set forth in Chapter VI, the present study does not lend itself well to an investigation of the "holding power" of the school. Nevertheless, there are clear indications from the data that Indian pupils, the country over, are not staying in school to the completion of their high school education in as large proportions as do white children. This is cause for genuine concern and indicates that some intensive studies of the school "drop-out" of Indian pupils should be made with a view to determining the causes, if possible, and seeking remedies for the situation.

THE RELATIONSHIP BETWEEN ACHIEVEMENT AND PLACE OF RESIDENCE

The data yield strong evidence that, on the average, Indian pupils who live **off** an Indian reservation achieve better than those who live **on** one. Likewise, Indian pupils who live in a town achieve somewhat better, on the average, than those who live in the country.

THE CHOICE OF FRIENDS BY INDIAN AND WHITE PUPILS

The findings concerning choice of friends by Indian and white pupils are of more than ordinary interest and importance. Each pupil was asked to indicate whether his friends were "all or mostly Indian" or "all or mostly white." Since only in the public schools did both Indian and white pupils attend in any considerable numbers, special importance attaches to the responses of the public school pupils.

Inasmuch as white pupils in the public schools greatly outnumbered their Indian schoolmates in most areas, it is not surprising that the great preponderance of white pupils said that most of their friends were white boys and girls.

What is surprising, to the investigators at least, is that in the Phoenix, Albuquerque, and Aberdeen Areas, although they had many more white schoolmates to choose from, a great majority of the Indian public school pupils said that all or most of their friends were Indian.

The Billings Area presents an especially revealing situation. Here Indian and white pupils in the public schools tested were in almost equal numbers. And yet more than 80 percent of both Indian and white pupils indicated that they were choosing all or most of their friends from their own race.

Only in the Oklahoma Areas was the usual pattern departed from. In the Muskogee and Anadarko Areas a substantial proportion, and in many grades a majority, of the Indian pupils indicated that most of their friends were white.

It seems clear that mere attendance of the children of two races in the same school does not necessarily lead, immediately at least, to their choosing their friends without regard to race.

THE RELATIONSHIP BETWEEN CHOICE OF FRIENDS AND ACHIEVEMENT

Because of the small number of Indian pupils claiming all or mostly white friends, little success was had in comparing achievement on the basis of choice of friends. In the few cases where comparisons were possible, no significant differences in achievement were found between groups of Indian pupils claiming that most of their friends were white and those who said that most of their friends were Indian. It must be pointed out that this does not disprove the assumption that Indian pupils may learn better if they attend school with white pupils. Presumably one may learn from a schoolmate or associate even though he does not consider him a close friend.

THE RELATIONSHIP BETWEEN THE ACHIEVEMENT OF INDIAN PUPILS AND THE PROPORTION OF WHITE PUPILS IN THE SCHOOL

The evidence that Indian pupils achieve better if they attend a school composed mostly of white pupils is far from convincing. Since Federal and mission schools enroll few, if any, white pupils, this phase of the investigation was confined to public schools. As a result of this and other factors, it was possible to make only a small number of comparisons. There may be a slight indication that Indian pupils attending a school composed mostly of white pupils, or where the enrollment is at least half white, achieve better than those attending a school composed mostly of Indian pupils, but the data are by no means conclusive.

THE RELATIONSHIP BETWEEN ACHIEVEMENT AND REGULARITY OF ATTENDANCE

As would be expected, pupils who attended school regularly tended to achieve better than those who were irregular in their attendance. The investigation of this question was confined to the day schools of the Aberdeen Area where factors of distance, severe weather, and seasonal employment combine to make the attendance problem especially acute. It may be surprising to some that the evidence is no more overwhelming than it is. It should be remembered that regularity of attendance is only one factor which influences achievement.

There is no reason to doubt that if all other variables could be held constant pupils who attend school regularly would achieve consistently higher than those who do not.

Of the pupils studied, the greatest absence was among Indian pupils attending Federal schools, the next greatest among Indian pupils attending public schools, and the least among white pupils attending public schools. Since nearly all of the mission schools in the Aberdeen Area are of the boarding type, no mission school pupils were studied. Once again, the cultural differences existing among the various race-school groups must be pointed out.

THE RELATIONSHIP BETWEEN ACHIEVEMENT AND THE EDUCATIONAL ASPIRATION OF PUPILS

There is striking evidence that the higher achieving pupils expect to go farther in school than do the low achievers. Assuming that a cause and effect relationship exists, we can not tell from the data whether high achievers expect to go farther in school because they learn well, or whether they learn well because they are motivated by higher aspiration. Perhaps each contributes something to the result.

Several other findings are worthy of special mention. The great preponderance of even fourth, fifth, and sixth-grade pupils, regardless of area or race-school group, expected to get at least some high school training. In general more of the pupils of both races in the Oklahoma areas expected to get some sort of post-high school training than was true for the other areas. There was a slight, although not a consistent, tendency for a greater proportion of white pupils than Indian in the elementary and intermediate grades to aspire to education beyond high school. This proportion was likely to reverse itself in the eleventh and twelfth grades, however.

Especially interesting is the fact that even at the fourth-grade level the relationship between educational aspiration and achievement had begun to manifest itself.

THE USE OF ACHIEVEMENT TESTS FOR INSTRUCTIONAL AND GUIDANCE PURPOSES

Chapter VII is devoted to a description of suggested ways of using achievement test results for the improvement of instruction and pupil guidance at the classroom level. It is not feasible to attempt to summarize it here. The chapter is intended as a kind of handbook or guide for use by teachers and supervisors.

THE PROPER USE OF PREDICTIVE TEST RESULTS

Chapter VIII is concerned with a description of the proper use of test results obtained with the pre-college and pre-commercial test batteries, with a view to predicting probable success or failure in post-high school academic study. Again, it is not practicable to summarize it in this chapter. Chapter VIII was prepared for use by those persons who must assume responsibility for making decisions concerning the granting of educational loans or grants in aid, or admission to certain courses of study.

IN CONCLUSION

A summary chapter in its very nature has limitations. There is a tendency to oversimplify findings and to state them too categorically. It is hoped that the serious reader will find time to go to the several chapters for more precise information concerning the questions investigated.

CHAPTER II

PURPOSES AND PROCEDURES OF THE STUDY

Early in 1950 an agreement was entered into between the Bureau of Indian Affairs and the University of Kansas whereby the University would render technical and consultant services to the Education Branch of the Bureau in the field of educational research. Pursuant to this agreement, in a series of three conferences held in late 1950 and the first half of 1951, the purposes of the present study were defined and the procedures to be followed were outlined. The first meeting was held at Haskell Institute in Lawrence, Kansas, on December 13 and 14, 1950. Representing the Bureau of Indian Affairs were: Dr. Willard W. Beatty, then Chief of the Education Branch of the Bureau; Dr. George A. Dale, Mr. Earl C. Intolubbe, and Mr. L. Madison Coombs, Education Specialists in the Education Branch; and Dr. Solon G. Ayers and Mr. W. Keith Kelley, Superintendent and Principal, respectively, of Haskell Institute. Representing the University of Kansas were: Dr. Kenneth E. Anderson, Dr. E. Gordon Collister, and Mr. Carl E. Ladd who had been designated by the University as consultants to the program.

On April 27, 1951, Dr. Beatty, Mr. Coombs, Dr. Ayers, and Mr. Kelley again met with the consultants from the University of Kansas at Haskell Institute.

On June 15, 1951, Dr. Anderson, Dr. Collister, and Mr. Ladd went to Intermountain School at Brigham City, Utah, for a final conference with Dr. Beatty and administrative and supervisory personnel of the Bureau of Indian Affairs, including the Area Directors of Schools or their representatives.

PURPOSES

During the course of these conferences it became clear that the testing program should take two directions in order to serve best the needs of the Bureau of Indian Affairs. These were for prediction and the measuring of achievement.

Predictive Testing

A battery, testing academic aptitude, was needed to help predict the probable success, or lack of it, of high school graduates who wished to continue their education at the post-high school level. The planning and implementation of this phase of the program is described in detail in Chapter VIII.

Achievement Testing

The main purposes to be served by an achievement testing program were twofold.

Administrative Use. The continuing evaluation of the status of educational achievement of children in a school system was recognized to be not only sound but indispensable school practice. In no other way could a satisfactory evaluation be made of progress toward the objectives of the schools. On the basis of objective findings, such things as curriculum planning, teaching procedures, and the use of instructional materials could be shaped accordingly.

Furthermore, since schools of three different administrative types, Federal, public, and mission, were engaged in the education of Indian children, often in the same general localities, it would be helpful to be able to make comparisons of the general level of achievement of pupils in the different types of schools. This was particularly true since the responsibility for the education of Indian children was being transferred from Federal to public schools in many communities by contract agreement. In the absence of objective data, comparisons of the three types of schools were too frequently based on mere speculation or assumption of fact.

It was recognized that, along with measurement of pupil achievement, it would be necessary to examine those cultural background factors which were believed to influence school achievement.

School Uses. One of the shortcomings of earlier achievement testing programs had been that they were aimed exclusively at satisfying the administrative needs mentioned above. As a consequence, local school personnel, particularly classroom teachers, and public and mission school people generally, saw little relationship between the programs and what they were trying to do in the course of their daily work. It was determined that test results should be made functional at the classroom level and that achievement testing should become an integrated part of the entire instructional program.

1. Pupil Guidance. Test results, then, would be made to serve in the educational guidance of individual pupils, not only by determining his status at a given time but also by charting his growth and development over a span of time. It would also be possible to detect his areas of greatest strength and weakness and to plan help for him accordingly. What could be done for individuals in this regard could also be done for groups.

2. Improvement of Instruction. At the same time, the test results would place in the hands of the teacher a means of evaluating the effectiveness of her instruction and of ascertaining the needs of her pupils. Emphasis was placed upon the teacher's use of this tool rather than upon its use by someone in a supervisory capacity, unjustifiably, as a teacher-rating technique.

PROCEDURES

Out of the Haskell and Intermountain conferences, mentioned earlier, grew certain decisions affecting procedure.

Decision to Test the Basic Skills

It was decided to limit the achievement testing to the basic skills; namely, reading, arithmetic, language usage, and spelling. There were several reasons for this decision. First, it was felt that the objectives of the several types of schools participating were much more uniform with respect to the basic skills than would be true if the "content" subjects were included. All schools, regardless of type, strive to make their pupils literate. Second, the basic skills are fundamental. They are tools which are used in most other learnings. Third, in view of the large number of pupils to be included in the program, it would be necessary to select a standardized test which was adapted for machine scoring, since hand scoring would be too burdensome and time consuming. Tests in special fields, such as home economics, health and safety, and use of resources, prepared in earlier years by the Bureau of Indian Affairs, were not set up for machine scoring.

Decision to Test Grades Four Through Twelve

If test results were to provide a means of charting pupil growth, it was felt that all grades, starting at four and continuing through twelve, should be tested. No testing would be done below grade four. There were two compelling reasons for this latter decision. First, no satisfactory achievement test was found which could be machine scored at the primary level. Second, grave doubts were entertained as to the validity or reliability of standardized test results obtained from such young children.

Decision to Introduce the Program in One or Two Areas Each Year Over a Period of Several Years

No research study can be better than the validity and the reliability of its basic data. For this reason it was decided to develop the program very carefully by introducing it in only one or two areas each year over a period of several years. It was felt necessary to orientate carefully a large number of persons in all types of schools, not only in the proper administration of the tests but particularly in the effective use of test results.

Decision to Use the California Achievement Test

The California Achievement Test was chosen for use for the following reasons: first, it was available in a machine scoring edition; second, it had already found wide favor among the schools of the Bureau of Indian Affairs and was widely used in local programs; third, its content seemed to be as valid for Indian children as that of any other test available.

Decision to Test in the Fall of the Year

The decision to test in the fall of the year rested mainly on the advantage the teacher would have in using test scores during the same school year in which they were obtained, for the guidance of her pupils and for the improvement of her teaching.

Decision to Start With the Albuquerque and Phoenix Areas

The Albuquerque and Phoenix Areas were selected for the first year's program in 1951 mainly because the Directors of Schools for those areas were present at the Intermountain conference and expressed a willingness to take the lead in developing the program. Both Mr. Vernon L. Beggs of Albuquerque and the late Mr. George C. Wells of Phoenix were experienced in the measurement field. The Albuquerque and Phoenix Areas were adjacent to each other, which would facilitate administration of the program. In addition, the two areas bore certain cultural similarities to each other.

A General Formula for the Inclusion of Public and Mission Schools

It was agreed that the following conditions should be met in selecting public and mission schools for participation: first, they should be rural, not urban, schools. That is to say, no school operating in a community of more than 2,500 population should be included; second, they should operate in the same general locality as an Indian Bureau school or schools; third, public schools participating should have in their enrollment a considerable proportion of Indian pupils; fourth, the combined number of public and mission school pupils included in a given area should be approximately the same as the number of pupils in the Federal schools; fifth, the administrators and teachers of cooperating public and mission schools should feel a real desire to participate and see value in the program for their own purposes. Obviously, it would not be feasible to include in the program all public schools which enrolled Indian pupils. It was agreed that, in every school participating, all pupils would be tested regardless of race.

Specific Planning

Working within the framework of the criteria listed in the preceding paragraph, Area Office personnel in the Albuquerque and Phoenix Areas contacted public and mission schools in July of 1951 and late that month sent to the Evaluation Office at Haskell Institute a list of the schools that would participate, and an estimate of the number of pupils who would be tested at each grade level. The response by the public and mission schools was gratifying and beyond expectation, particularly in the Albuquerque Area.

On September 14 a training session was held at Albuquerque, New Mexico. In attendance were Federal, public, and mission school personnel from both the Albuquerque and Phoenix Areas, representing nearly every school that would participate as well as the two Area Offices involved. The consultants from the University of Kansas and the representative from the Evaluation Office at Haskell Institute were also present. In addition, representatives of the Arizona State Department of Education attended.

The purposes of the program, described earlier, were discussed thoroughly by the group. Attention was then given to methods of standardizing the testing procedure so that it might be uniform in all schools and the test results be made as dependable as possible.

It was agreed that the tests would be given by teams of trained test administrators; that is, persons experienced in testing and who had familiarized themselves completely with the test to be used, the directions provided, and the uniform procedures agreed upon at the meeting. Wherever feasible the teams would be composed of representatives of at least two of the three types of schools involved. Responsibility for the actual selection and training of the testing teams was placed in the hands of the Director of Schools of each of the areas.

Other matters which were pursued were: the filling out of the information sheet, designed to elicit background data about the pupil; the use of the sample question sheet; and the mechanics of shipping testing supplies from the Evaluation Office to the field and returning completed answer sheets and background sheets to the University of Kansas.

CARRYING OUT THE PROGRAM

Immediately after the Albuquerque conference, a general manual of instructions was composed and mimeographed by the Evaluation Office. This and all other testing supplies were then shipped to the field. (The general manual of instructions, and the background information sheet, previously alluded to, are shown in Appendix A.)

The tests were administered by the testing teams in October and early November of 1951. There was ample evidence that, with few exceptions, the tests were well administered and that confidence could be placed in the methods used.

Completed answer sheets and background information sheets were returned to the Guidance Bureau of the University of Kansas as soon as they were completed for any one grade in any one school. They were then machine scored by the Guidance Bureau. As soon as scoring was completed for a group, the scores were recorded on roster sheets provided for the purpose. Group means and grade equivalent scores were computed by the Evaluation Office and likewise recorded on the roster sheet. The results were then mailed back to the field with copies going to the Area Director of Schools, the Reservation Principal, and the School Principal.

As soon as the scoring for an area was completed, separate norms, based on the test scores for that area, were computed and student profile sheets and acetate grade norm overlays were constructed.

Follow-up meetings were held in Albuquerque on February 28, 1952, and at Phoenix on March 1, 1952, for the purpose of familiarizing Federal, public, and mission school representatives with these devices and their most effective use. In addition, meetings were held on most of the reservations for the instruction of classroom teachers.

The use of the interpretive devices and techniques referred to above is the subject of Chapter VII of this report.

When the data became available, both test scores and background information were punched on IBM cards for analysis.

A similar pattern of preparation and follow-up was followed in each of the other four areas that participated in the program; i.e., the Aberdeen Area in 1952, the Billings Area in 1953, and the Anadarko and Muskogee Areas in 1954.

The Aberdeen Area

As early as September of 1951 Mr. Leslie M. Keller, Director of Schools for the Aberdeen Area, had requested that his area be selected for the 1952 program. It was so designated. From April 25 to May 14, 1952, most of the jurisdictions in the Aberdeen Area were visited by a representative each from the Evaluation Office and the Area Office for the purpose of stimulating interest in the forthcoming program and providing information about it. The Reservation Principals were given the responsibility for securing the cooperation of public and mission schools. They were very successful.

A training session was arranged by Mr. Keller to be held in Aberdeen, South Dakota, on September 18. The meeting was well attended by representatives of the Federal, public, and mission schools engaging in the program. A representative of the South Dakota State Department of Education and a number of County Superintendents of Schools from North Dakota and South Dakota were present. Dr. Anderson, Dr. Collister, Mr. Ladd, and Mr. Coombs attended. Testing supplies which had previously been shipped to Aberdeen were distributed at this meeting.

By mid-November the tests had been administered and scored and by January of 1953 norms and interpretive devices for the Aberdeen Area had been developed. On January 30 Dr. Collister, Mr. Ladd, and Mr. Coombs again met in Aberdeen with Mr. Keller and the Area Office staff and with representatives from all of the participating schools. At this meeting the use of the interpretive devices and techniques was explained. Subsequent to this meeting, Mr. Coombs spent several days in the area holding meetings with classroom teachers in the various jurisdictions and explaining proper use of the materials to them.

The Billings Area

At the request of Miss Louise C. Wiberg, Director of Schools, the Billings Area was scheduled for the developmental testing program for the fall of 1953. Public schools in Montana were contacted with the approval and assistance of the Montana State Department of Education, through its representative, Mr. K. W. Bergen.

Miss Wiberg and Mr. Coombs laid the groundwork for the program by calling at the several jurisdictions in the area during the two-week period following May 4, 1953. With the help of the Reservation Principals, they contacted a number of public and mission school administrators in Montana and Wyoming. The Reservation Principals completed this phase of the work during the summer months.

The usual training session was arranged by Miss Wiberg for September 21 at Billings, Montana. Mr. Bergen of the Montana State Department attended, together with a good representation of County Superintendents and administrators of local school systems. All Reservation Principals were present. Dr. Anderson, Dr. Collister, and Mr. Coombs attended, as did Mr. Ralph E. Kron who had replaced Mr. Ladd on the University staff.

The administering and scoring of tests proceeded on schedule and the norms and interpretive devices were constructed for the Billings Area. However, because of weather conditions and other considerations, these materials were not taken to the field until about March 1, 1954. A central meeting was dispensed with and Mr. Coombs and Mr. Kron, after calling at the Area Office, proceeded directly to the field. Through arrangements made by the Reservation Principals, they were able to present the interpretive materials to most of the teachers of the public and mission schools as well as to the Federal school teachers.

The Oklahoma Areas

Starting in the fall of 1952 and continuing in 1953, the four reservation boarding schools of western Oklahoma had begun to develop achievement testing programs on a local scale. At about the same time the Choctaw jurisdiction in Mississippi, attached to the Muskogee Area, began a local achievement testing program. All of these programs were using the California Achievement Tests and were being assisted by the Evaluation Office. As yet, of course, area norms had not been made available.

Upon the requests of Mr. Henry A. Wall and Dr. A. B. Caldwell, Directors of Schools of the Anadarko and the Muskogee Areas, respectively, a developmental and research program was scheduled for the two Oklahoma areas for the fall of 1954. In February of 1954 Mr. Wall and Mr. Coombs called at the Bureau schools of the Anadarko Area for the purpose of laying a groundwork for the program. On February 25 they met in Oklahoma City with Dr. Caldwell and Mr. W. H. Clasby, Director of Indian Education for the Oklahoma State Department of Education and with Mr. Haskell McDonald, assistant to Mr. Clasby. Plans for the program were sketched out at that time.

In May Mr. Coombs called at the Seneca and Sequoyah schools of the Muskogee Area and, with Mr. Clasby, contacted several of the public school administrators of eastern Oklahoma. Through the excellent joint efforts of Mr. Wall, Dr. Caldwell, Mr. Clasby, and Mr. McDonald a good organization of the testing program was effected during the late spring and early summer months.

Training sessions were held at Sequoyah Vocational School on September 20, for the Muskogee area, and at Riverside Boarding school the following day for the Anadarko Area. These meetings were attended by representatives of the cooperating public and Federal schools, by Dr. Caldwell and Mr. Clasby, in the case of the Sequoyah meeting, and by Mr. Wall and Mr. McDonald, in the case of the Riverside meeting. Dr. Anderson, Dr. Collister, Mr. Kron, and Mr. Coombs were present at both sessions. Testing supplies were distributed to the schools at these meetings.

The tests were administered during October and early November, as usual, and were scored by the University of Kansas. As in the case of the other areas, separate norms and interpretive instruments were developed for each area. In February 1955, Mr. Kron and Mr. Coombs took these to the field and, in a series of meetings, presented them to both public and Federal school teachers.

CHAPTER III

A COMPARISON OF THE ACHIEVEMENT OF PUPILS BY ADMINISTRATIVE AREAS

To say that America is a land of infinite variety is to repeat a cliche. The least discerning traveler cannot miss the topographical differences between the flat wheatlands of North Dakota and the wooded hills and streams of eastern Oklahoma. The Spanish influence upon the architecture, speech, and tempo of life of many of the communities of New Mexico and southern Arizona will be noted by the most casual observer. The climate of the hot and arid Papago Reservation bears little resemblance to the humid, verdant home of the Mississippi Choctaw. Both, in turn, are very different from the high, cool tableland of the Blackfeet Reservation. Papago children never see snow in their homeland, but Blackfeet children are treated to a dazzling display of it as it covers, on many a winter day, the entire towering range of mountains in Glacier National Park.

The variety of America, however, is not limited to its physical aspects. Its peoples, too, may differ greatly from community to community or from one section of the country to another. Most of us are aware of regional differences in accent, manners, and attitudes. For example, the wealthy dowager of "Back Bay" Boston and the wealthy Texas oil man may have little in common except their wealth. It has been pointed out often that the genius of America lies in the fact that, diverse as they may be, our people are drawn together effectively by the catalyst of democracy.

Yet, strangely enough, many persons seem to expect that if children will only go to school, those of one community or region will learn the same things at the same rate and at the same level of proficiency as those of another. The data in this study strongly indicate that this is not true. An enumeration of the principal tribal groups included in this study, many with widely divergent culture patterns, may help to give some clue as to the causes of the diversity of achievement of the various area groups.

DIVERSITY IN THE POPULATIONS TESTED

The Indian Groups

As has been noted in the preceding chapter, the achievement testing program was conducted independently in six different areas of the Bureau of Indian Affairs. This was, of course, largely a matter of administrative convenience. The areas themselves are somewhat arbitrarily defined administrative units. The Phoenix Area, for example, now includes all of the Indian groups in Arizona except the Navajo which is the largest. In this study the Indian children of the Phoenix Area were mainly Pima, Papago, San Carlos and Whiteriver Apache, and the Mojave and Chemehuevi of the Colorado River Reservation. At the time of the study the Hopi were still under the jurisdiction of the Window Rock Area.

The Albuquerque Area (now of agency status) served mainly the Pueblo groups distributed along the Rio Grande River and westward from it. In addition it included the Zuni, the Mescalero and Jicarilla Apache, and the Utes of Colorado.

The Indian population tested in the Aberdeen Area, which includes North Dakota, South Dakota, and the northeastern corner of Nebraska, was made up predominantly of the Sioux bands, a group of Chippewa, and smaller numbers of Cree, Arickara, winnebago, and other tribes.

In the Billings Area which embraces the States of Montana and Wyoming, the Indian children tested were mainly Blackfeet, Crow, Cheyenne, Assiniboine, Cree, Gros Ventre, Arapaho, and Shoshone.

The Indian children tested in the two Oklahoma areas represented a multiplicity of tribes with the Cherokee and Choctaw predominating in the Muskogee Area and the Kiowa, Comanche, Pawnee, Cheyenne and Arapaho in the Anadarko Area.

These six administrative areas may be said to fall more or less roughly into three cultural areas: first, the Southwestern tribes of Albuquerque and Phoenix Areas; second, the Northern Plains tribes of the Aberdeen and Billings Areas; and, third, the Oklahoma tribes.

The Non-Indian Population

No implication is intended that Indian children alone are responsible for the diversity of achievement among the areas. It should be remembered that large numbers of white children were also tested in this study. Of the total population tested, 42 percent were white. The percentages of white children varied from area to area, ranging from a low of 20.1 percent in the Phoenix Area to a high of 59.1 percent in the Muskogee Area. This is shown in Table 3-a.

Table 3-a
POPULATION TESTED BY AREAS AND RACE

Area	White	Percent	Indian	Percent	Total
Phoenix	433	20.1	1720	79.9	2153
Albuquerque	2290	46.9	2591	53.1	4881
Aberdeen	2860	37.3	4801	62.7	7661
Billings	1064	40.6	1555	59.4	2619
Muskogee	1955	59.1	1353	40.9	3308
Anadarko	1320	44.2	1666	55.8	2986
Total	9,922	42.0	13,686	58.0	23,608

Nor should it be assumed that the white children in this study were homogeneous with respect to achievement. They were far from it, as later evidence in this report will reveal. They came from many different national stocks and they, as well as the Indian children, undoubtedly had their cultural differences.

Some Broad Cultural Differences Among the Areas

It would be more than presumptuous of the writers to attempt a definitive explanation of the causes of differences in achievement level among the several areas. Too many interacting factors are at play and too many intricate cross currents of influence have been set in motion through the years to permit a clear-cut analysis even by a qualified sociologist or ethnologist. It may not be out of order, however, to suggest a few broad cultural differences which exist among the areas and which may have some bearing on the level of educational achievement.

It was not by mere chance, or because of lack of administrative planning, that relatively few white children were tested in the Phoenix Area. The fact was simply that relatively few white children lived or attended school near the Indian children of most of the reservations of that area. The Apache and Papago Reservations, particularly, are rather remote from white influence.

The Pueblo villages of the Albuquerque Area present a somewhat different situation. Several, although not all, of them lie quite close to heavily traveled Federal and State highways. The Pueblo peoples have embraced much of the dominant culture of the country, but they have also tenaciously and successfully preserved much of their own culture. The Pueblo peoples have been in contact with whites, sometimes unhappily, since 1540, sixty-seven years before the Jamestown settlement. In spite of this, a high percentage of the children in many of the villages speak no English upon entering school. The non-Indian neighbors of the Pueblo children are largely of Spanish extraction. Many of them have Spanish as a "first" language and many of the children speak little or no English upon school entrance.

For the most part the Indians of the Aberdeen and Billings Areas live in relatively open country where travel is comparatively easy. Furthermore, under the impetus of the Allotment Act of February 8, 1887, many white persons purchased land from individual Indians and moved on to Indian reservations, there to live as neighbors of the Indian people. Much of this went on in the Aberdeen and Billings Areas and resulted in what is often referred to as the "checkerboarding" of the reservations. A great deal of intermarriage has occurred in these areas between Indians and whites with consequent dilution of Indian blood. Relatively few cases were found in the Aberdeen or Billings Areas of Indian children who did not speak at least some English upon entering school. The white settlers of these areas, on the other hand, were predominantly of northern European stock who either had English as a first language or acquired it very rapidly. Their culture patterns were similar to those of the dominant population of the United States.

The populations tested in the Oklahoma areas have some background characteristics peculiarly their own. Oklahoma is perhaps the most "Indian" of all the States. It was Indian Territory long before it achieved statehood. A high percentage of Oklahoma residents today claim some degree of Indian blood, however minute. The so-called Five Civilized Tribes of eastern Oklahoma have long been among the most sophisticated of all the Indian groups. They have contributed many of the outstanding Indian leaders to the nation in the fields of law, politics, the ministry, education, the arts, sports, and many other lines of endeavor. The relatively low position of the Muskogee Area in the hierarchy of achievement (see below) may come as a surprise then to many readers. It should be made clear, therefore, that no claim is made that the findings of this study hold true for all of the people of eastern Oklahoma but, rather, only for those communities included in the study. The same word of caution applies to all other areas. As has been said, the test was given in schools operated by the Bureau and in nearby public and mission schools enrolling a considerable number of Indian pupils.[1] The writers feel that the population tested in the Muskogee Area, both Indian and white, in general represents a somewhat sequestered group of people. The Anadarko Area, which held first place in the area hierarchy of achievement at the elementary and intermediate levels, is similar to the Northern areas in its topographical openness. While in general its Indian people have not been in contact with white people for as long a period of time as have those of the Muskogee Area, they have, nevertheless, been in continuous and intimate association with whites for a good many years.

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[1] There were no mission schools in the Anadarko or Muskogee Areas.

TABLE 3-b

SUMMARY OF THE RANKINGS OF THE AREAS

Reading Vocabulary

1. Billings
2. Anadarko
3. Aberdeen
4. Muskogee
5. Albuquerque
6. Phoenix

Reading Comprehension

1. Billings
2. Anadarko
3. Aberdeen
4. Muskogee
5. Albuquerque
6. Phoenix

Arithmetic Reasoning

1. Anadarko
2. Billings
3. Aberdeen
4. Muskogee
5. Albuquerque
6. Phoenix

Arithmetic Fundamentals

1. Billings
2. Aberdeen
3. Anadarko
4. Albuquerque

5. and 6. Muskogee) Tie
Phoenix)

Language

1. Anadarko
2. Muskogee
3. Billings
4. Albuquerque
5. Aberdeen
6. Phoenix

Spelling

1. Aberdeen
2. Anadarko
3. Billings
4. Muskogee
5. Albuquerque
6. Phoenix

Total Score

1. Anadarko
2. Billings
3. Aberdeen
4. Muskogee

5. and 6. Phoenix) Tie
Albuquerque)

Overall Ranking

(Standard scores were assigned on the basis of rankings on each skill and then totalled and averaged.)

1. Anadarko
2. Billings
3. Aberdeen
4. Muskogee
5. Albuquerque
6. Phoenix

THE HIERARCHY OF AREAS IN ACHIEVEMENT

Method of Obtaining a Rank Ordering

An attempt has been made to arrange the six areas, including both races and all three types of schools, into a hierarchy of achievement. The method is firstly based on a comparison of mean raw scores of the six areas for each of the six skills, and total score, for each of the nine grades. The area having the highest mean score on one of the skills at a given grade level was ranked as first, the next highest was rank second, and so on down to the sixth rank. To illustrate, at grade four the Muskogee Area had the third highest mean of the six areas for reading vocabulary for which it was assigned a rank of three. The same area had the fifth highest ranking mean on reading vocabulary at grade five for which it was assigned a rank of five. This procedure was followed until each area had been assigned a rank in each grade for each of the seven means.

Table 3-b is a summary of all grades showing the rankings of all the areas on all skills. This was effected by the method of assigning a normalized standard score to each previously assigned rank.[2] These standard scores of each area for each grade were then averaged to obtain the summary skill rank shown in the table. Standard scores assigned to the summary ranks of the areas in each skill were likewise averaged to obtain an over-all ranking of the areas. It was then possible to make tests for significance of difference between mean standard scores assigned to the ranks.

No account was taken of the magnitude of differences between mean **raw** scores. However, the method did take into account the ranks for all areas in all grades and skills and it is felt that a valid hierarchy emerged.

The Areas in Rank Order

The final rankings of the areas, obtained by comparing the mean standard score assigned to area rankings, are as follows: 1. Anadarko, 2. Billings, 3. Aberdeen, 4. Muskogee, 5. Albuquerque, and 6. Phoenix. Significant differences between the means of standard scores were found between all pairs of areas with the exception of Anadarko and Billings, the two top-ranked areas. (See Appendix B.) The hierarchy of area achievement is thus rather clear-cut.

Differences Among the Areas

It should be noted, however, by reference to Table 3-b, that the position of the areas shifted rather frequently as among the several skills. No area was consistently in first place. The Phoenix Area was never higher than a tie for last, but no other area held a particular rank unvaryingly throughout all of the skills. Figures III-1, III-2, and III-3 show this same tendency for areas to shift positions in the hierarchy as among the nine different grade levels, with "total score" only being considered. Without attempting to point out all of these variations, it may be remarked that the Anadarko Area was without exception the highest in grades four through nine. However, when combined with the Muskogee Area (from which it was not statistically different) at the advanced level, it fell to a third and fourth place tie for grades ten and eleven, and to a fourth and fifth place tie in grade twelve. The Phoenix Area was unvaryingly lowest in grades four through eight, but rose to fourth position in grade nine, fell to fifth in grades ten and eleven, and rose again to third position at the twelfth-grade level. Other shifts in position in the hierarchy, by the several areas among the different grade levels, will be revealed by an examination of Figures III-1, III-2, and III-3. These shifts in position do not invalidate the general ranking of areas as indicated above. They do serve to call attention to a fact which is not revealed by the mere

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[2] Cf. K. E. Anderson, R. T. Gray, and E. V. Kulstedt. 1954 Tables for transmutation of orders of merit into units of amount. Journal of Experimental Education, XXII:247-264.

Figure III-1

AREA MEAN ACHIEVEMENT COMPARISONS ON TOTAL SCORE IN GRADES 4, 5, & 6

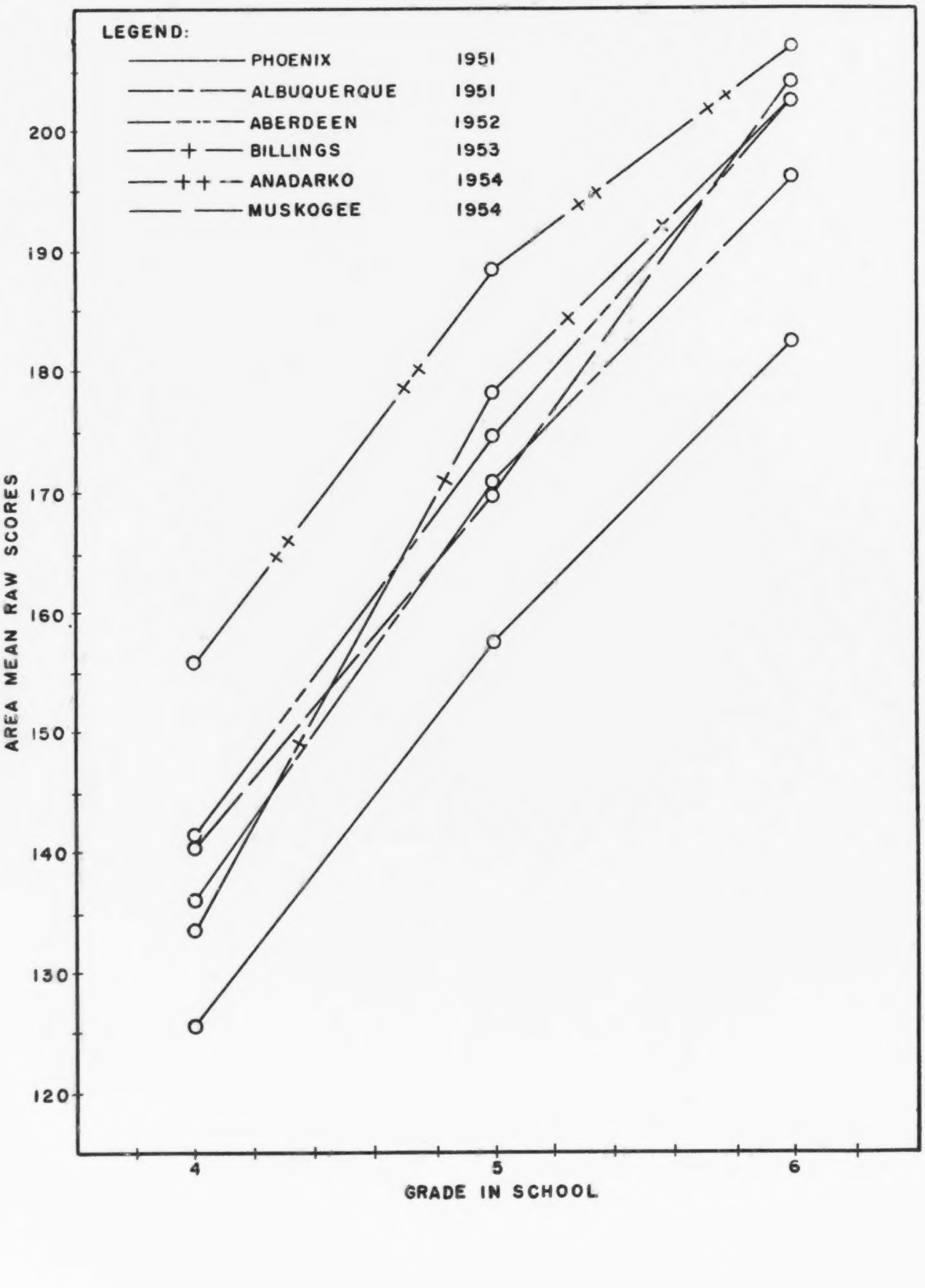


Figure III-2

AREA MEAN ACHIEVEMENT COMPARISONS ON TOTAL SCORE IN GRADES 7, 8, & 9

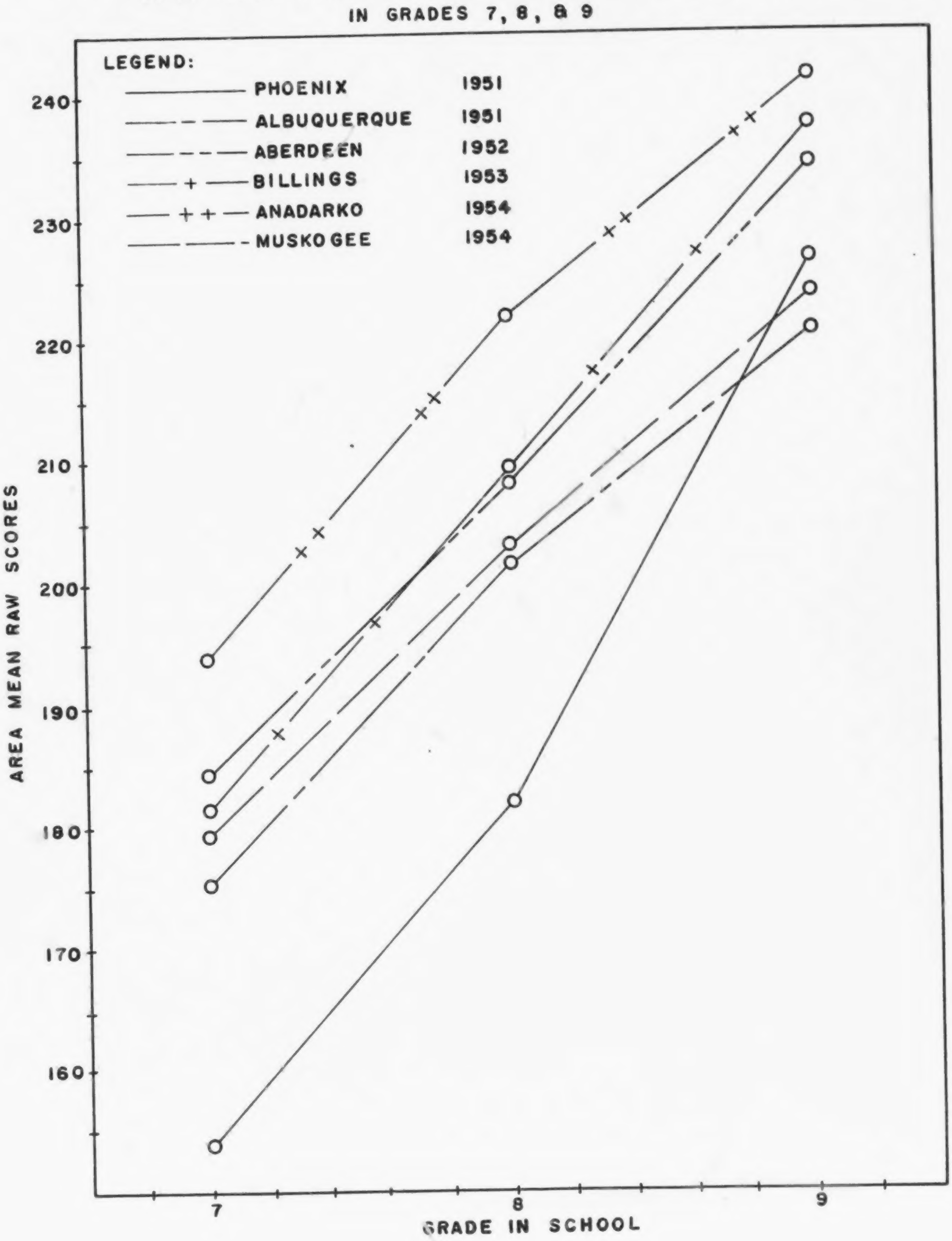
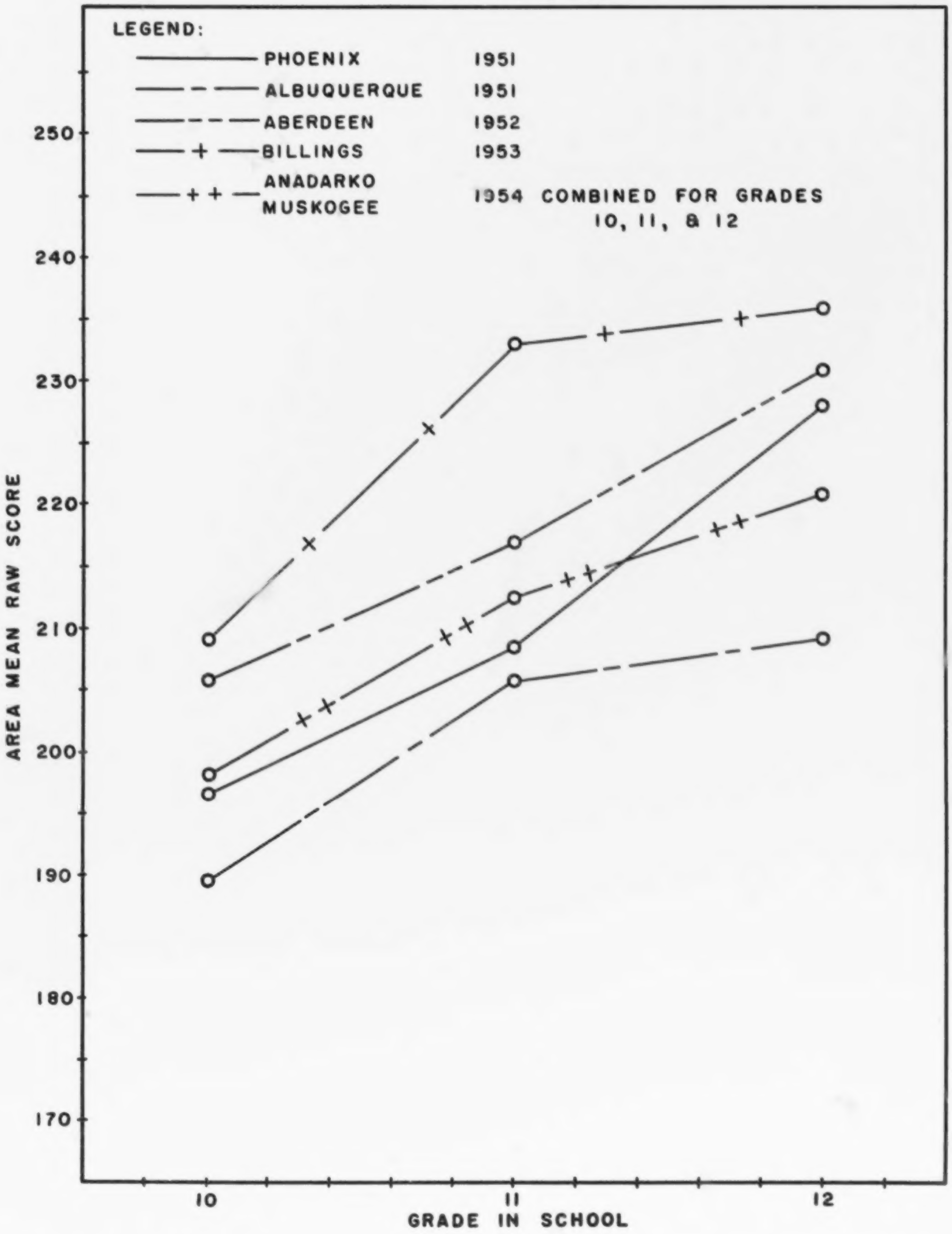


Figure III-3

AREA MEAN ACHIEVEMENT COMPARISONS ON TOTAL SCORE IN GRADES 10, 11, & 12



comparison of mean achievement of the areas, and that is the great amount of overlap in the range of achievement among them. Even in the Phoenix Area, which was most consistently ranked as lowest, there were many individuals who, in each skill, scored higher than some individuals at their grade level in any of the other areas. The next section will illustrate what percentage of pupils could be considered above average, average, or below average in any skill, for any grade, in an area.

COMPARISON OF AREAS IN RELATION TO A COMPOSITE NORM

Derivation of the Composite Norm

A different approach to comparing achievement in the six different areas is shown in Figures III-4 through III-12. Here the achievement of pupils in each area is compared with that of a composite norm group composed of **all** the pupils, both Indian and white, tested in all six areas. The comparison is broken down by grades and by skills. The composite norms were established by calculating the raw score mean and standard deviation for the composite group on each skill, and total score, for each grade level. Raw score values were then fixed at the mean and plus-and-minus one standard deviation from the mean for each grade. Assuming that the distributions are normal, approximately 68 percent of the cases fall between the raw scores at plus-and-minus one standard deviation from the mean; about 16 percent fall above plus 1 S.D. and the remaining 16 percent below minus 1 S. D.[3] These three strata of achievement are shown in the scale at the top of each figure and are designated as "average", "below average", and "above average." This scale serves as a standard for comparison.

Use of the Composite Norm to Define Levels of Achievement

The pupils in the several areas, of course, achieved differently from each other and also differed from the composite norm group. These differences are shown, by the device described in the preceding paragraph, in Figures III-4 through III-12. For example, Figure III-4 shows that in reading vocabulary 67.4 percent of the pupils tested in the Phoenix Area were average. This is not different from the normal percentage. However, 23.3 percent were below average, whereas in the norm group only 16 percent were at this level, and 9.3 percent were above average; considerably fewer than the normal 16 percent. On the other hand, the Anadarko Area had a smaller proportion of pupils in the average range, 56.9 percent as compared to 67.4 percent for the Phoenix Area and 68 percent for the norm group. Of the Anadarko fourth graders, only 7.7 percent were below average in reading vocabulary, however, and 35.4 percent were above average. This compares with 23.3 percent and 9.3 percent for the Phoenix Area and 16 percent and 16 percent for the composite norm group. All of the graphs in Figures III-4 through III-12 should be read in this manner. The number of pupils in each group is shown in the column headed by "N."

Reasons for Developing Differentiated Norms

The composite norm group was used for the purpose of demonstrating the desirability of developing separate sets of norms for each of the six areas.[4] The make-up of the composite norm group by grade levels is shown in Table 3-c.

Table 3-c

NUMBERS IN THE COMPOSITE GROUPS

Grade 4 ——	3206	Grade 9 ——	2834
Grade 5 ——	3077	Grade 10 ——	2314
Grade 6 ——	3006	Grade 11 ——	1723
Grade 7 ——	3056	Grade 12 ——	1527
Grade 8 ——	2865	Total	23,608

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[3] According to statistical tables of areas and ordinates of the normal curve, more nearly exact percentages would be 68.26 percent, 15.87 percent, and 15.87 percent, respectively.

Figure III-4

PERCENTAGES IN ACHIEVEMENT LEVELS

By Administrative Areas

Grade 4

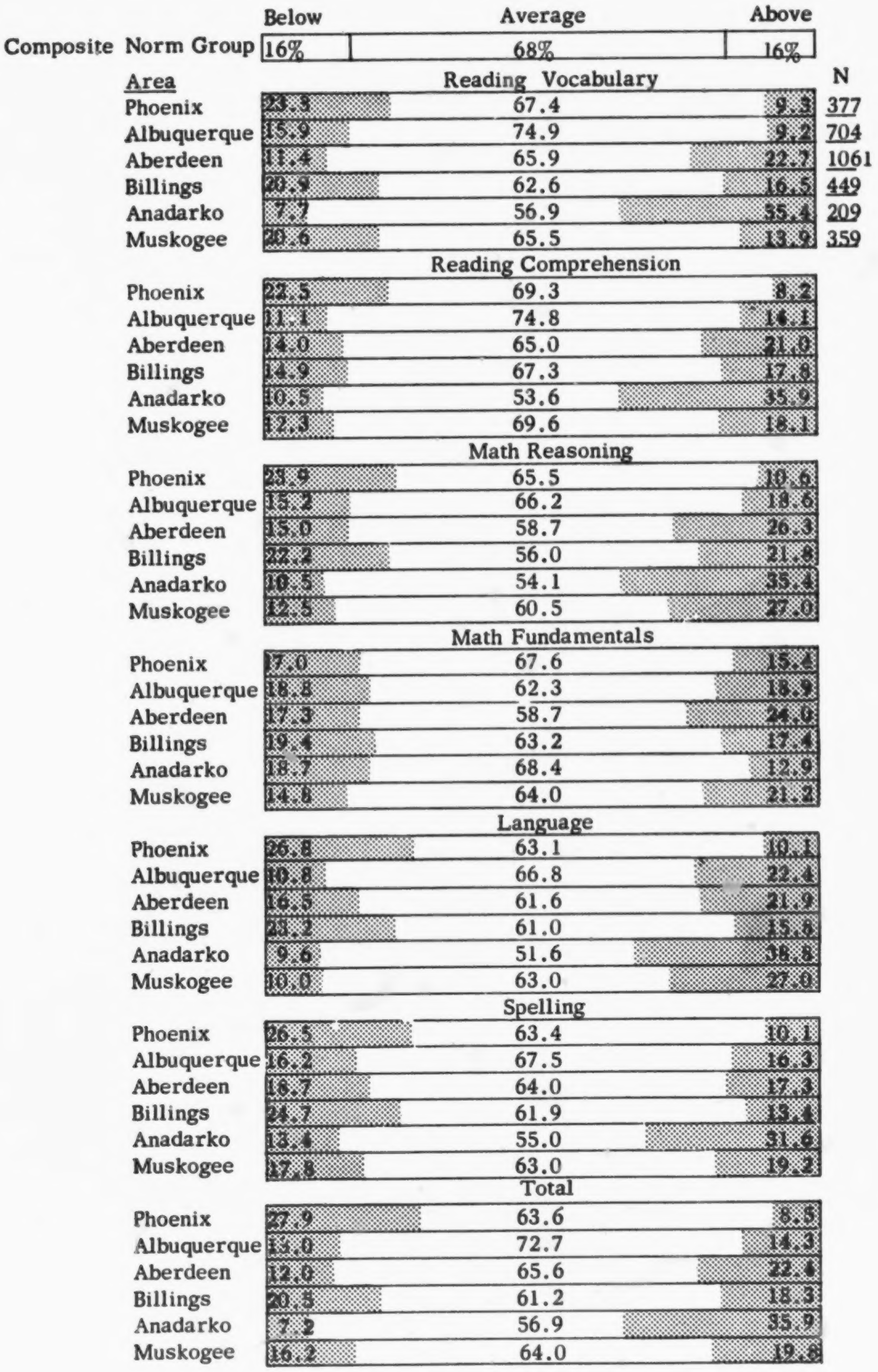


Figure III-5

PERCENTAGES IN ACHIEVEMENT LEVELS

By Administrative Areas

Grade 5

Area	Below	Average	Above	N
Composite Norm Group	16%	68%	16%	
Reading Vocabulary				
Phoenix	25.4	64.5	10.1	346
Albuquerque	17.1	71.1	11.8	586
Aberdeen	13.6	62.9	23.5	1044
Billings	11.9	62.0	26.1	445
Anadarko	7.4	56.4	36.2	243
Muskogee	18.9	68.5	12.6	366
Reading Comprehension				
Phoenix	37.3	56.3	6.4	
Albuquerque	22.0	66.9	11.1	
Aberdeen	19.7	61.4	18.9	
Billings	13.3	67.8	18.9	
Anadarko	9.5	56.3	34.2	
Muskogee	17.2	68.0	14.8	
Math Reasoning				
Phoenix	26.9	62.7	10.4	
Albuquerque	17.4	68.8	13.8	
Aberdeen	17.1	61.3	21.6	
Billings	17.3	62.5	20.2	
Anadarko	11.1	56.4	32.5	
Muskogee	16.1	64.2	19.7	
Math Fundamentals				
Phoenix	23.4	74.0	2.6	
Albuquerque	15.0	65.5	19.5	
Aberdeen	14.8	64.7	20.5	
Billings	12.8	71.7	15.5	
Anadarko	13.6	66.6	19.8	
Muskogee	20.2	63.4	16.4	
Language				
Phoenix	37.0	50.9	12.1	
Albuquerque	13.3	60.8	25.9	
Aberdeen	16.3	66.4	17.3	
Billings	16.9	62.9	20.2	
Anadarko	8.2	64.6	27.2	
Muskogee	10.9	66.4	22.7	
Spelling				
Phoenix	27.2	58.3	14.5	
Albuquerque	17.7	59.9	22.4	
Aberdeen	17.9	57.7	24.4	
Billings	16.2	57.3	26.5	
Anadarko	14.4	56.4	29.2	
Muskogee	22.1	56.3	21.6	
Total				
Phoenix	28.0	65.3	6.7	
Albuquerque	16.6	70.6	12.8	
Aberdeen	15.2	65.0	19.8	
Billings	13.3	66.3	20.4	
Anadarko	9.1	58.8	32.1	
Muskogee	15.9	69.9	14.2	

Figure III-6
PERCENTAGES IN ACHIEVEMENT LEVELS
By Administrative Areas

Grade 6

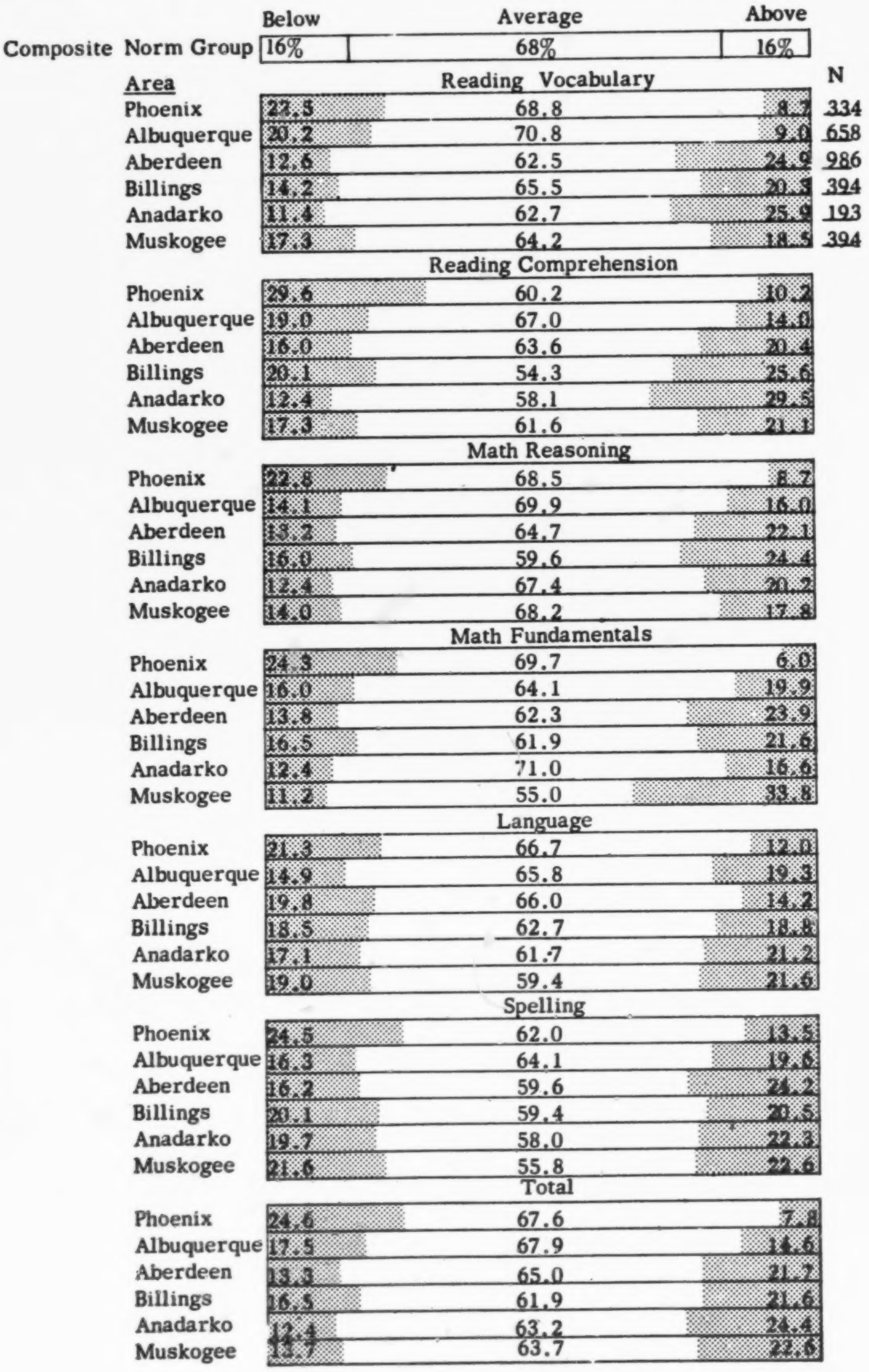
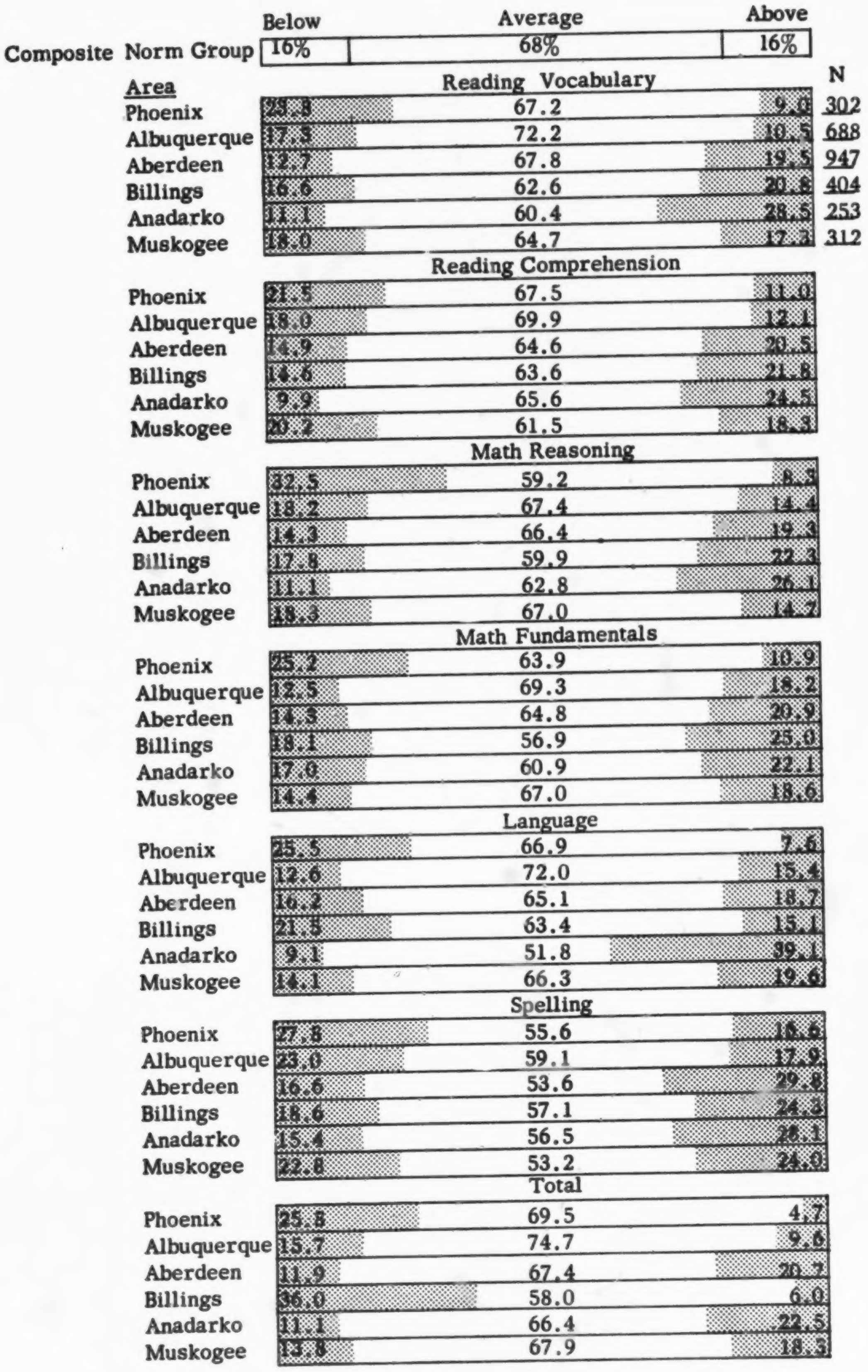


Figure III-7
PERCENTAGES IN ACHIEVEMENT LEVELS
By Administrative Areas

Grade 7



Area	Below	Average	Above	N
Composite Norm Group	16%	68%	16%	
Reading Vocabulary				
Phoenix	23.8	67.2	9.0	302
Albuquerque	17.3	72.2	10.5	688
Aberdeen	12.7	67.8	19.5	947
Billings	16.6	62.6	20.8	404
Anadarko	11.1	60.4	28.5	253
Muskogee	18.0	64.7	17.3	312
Reading Comprehension				
Phoenix	21.5	67.5	11.0	
Albuquerque	18.0	69.9	12.1	
Aberdeen	14.9	64.6	20.5	
Billings	14.6	63.6	21.8	
Anadarko	9.9	65.6	24.5	
Muskogee	20.2	61.5	18.3	
Math Reasoning				
Phoenix	32.5	59.2	8.3	
Albuquerque	18.2	67.4	14.4	
Aberdeen	14.3	66.4	19.3	
Billings	17.8	59.9	22.3	
Anadarko	11.1	62.8	26.1	
Muskogee	18.3	67.0	14.7	
Math Fundamentals				
Phoenix	25.2	63.9	10.9	
Albuquerque	12.5	69.3	18.2	
Aberdeen	14.3	64.8	20.9	
Billings	18.1	56.9	25.0	
Anadarko	17.0	60.9	22.1	
Muskogee	14.4	67.0	18.6	
Language				
Phoenix	25.5	66.9	7.6	
Albuquerque	12.6	72.0	15.4	
Aberdeen	16.2	65.1	18.7	
Billings	21.5	63.4	15.1	
Anadarko	9.1	51.8	39.1	
Muskogee	14.1	66.3	19.6	
Spelling				
Phoenix	27.8	55.6	16.6	
Albuquerque	23.0	59.1	17.9	
Aberdeen	16.6	53.6	29.8	
Billings	18.6	57.1	24.3	
Anadarko	15.4	56.5	28.1	
Muskogee	22.8	53.2	24.0	
Total				
Phoenix	25.8	69.5	4.7	
Albuquerque	15.7	74.7	9.6	
Aberdeen	11.9	67.4	20.7	
Billings	36.0	58.0	6.0	
Anadarko	11.1	66.4	22.5	
Muskogee	13.8	67.9	18.3	

Figure III-8
PERCENTAGES IN ACHIEVEMENT LEVELS
By Administrative Areas
Grade 8

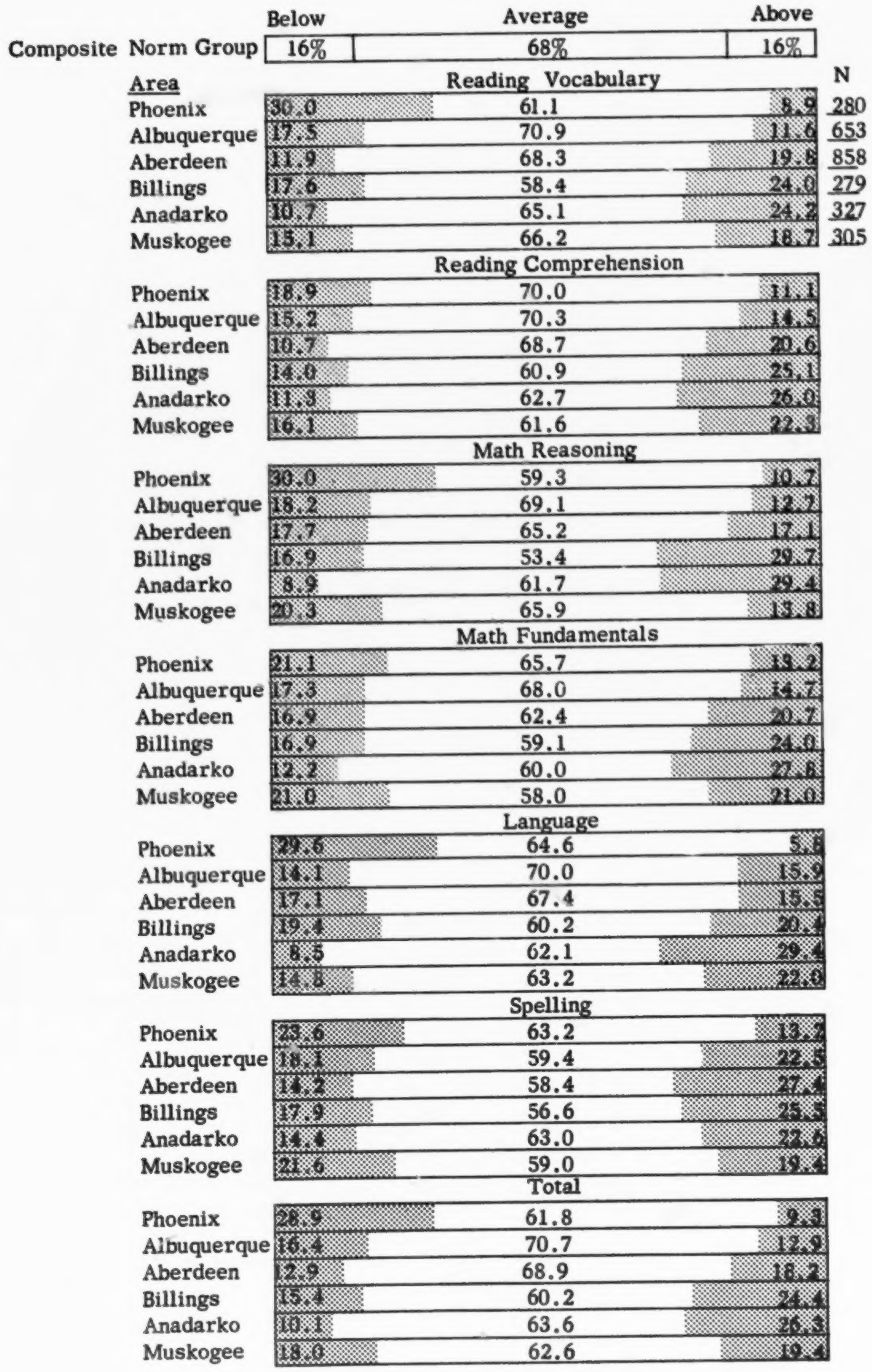
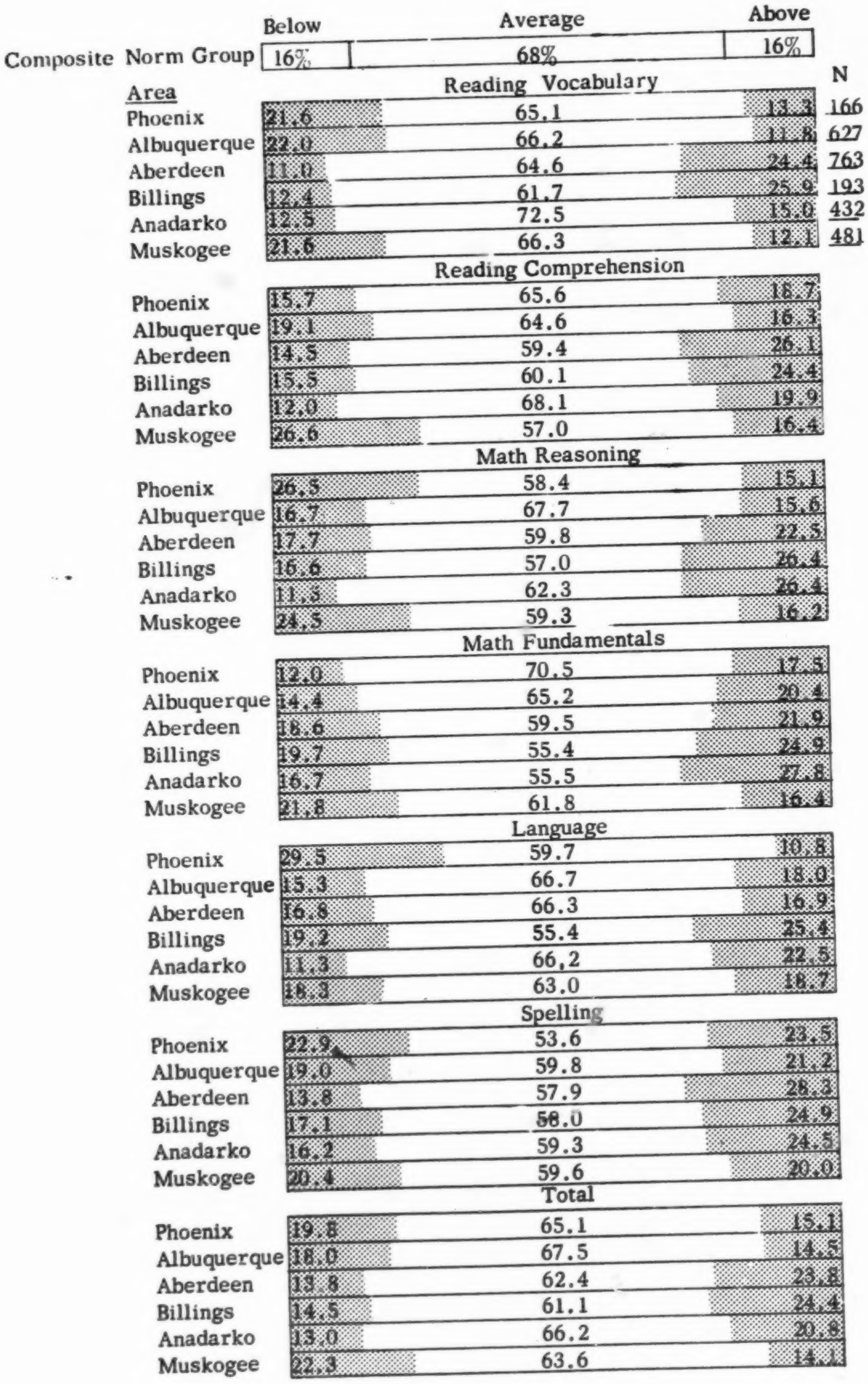


Figure III-9
PERCENTAGES IN ACHIEVEMENT LEVELS
By Administrative Areas

Grade 9



Area	Below	Average	Above	N
Composite Norm Group	16%	68%	16%	
Reading Vocabulary				
Phoenix	21.6	65.1	13.3	166
Albuquerque	22.0	66.2	11.8	627
Aberdeen	11.0	64.6	24.4	763
Billings	12.4	61.7	25.9	193
Anadarko	12.5	72.5	15.0	432
Muskogee	21.6	66.3	12.1	481
Reading Comprehension				
Phoenix	15.7	65.6	18.7	
Albuquerque	19.1	64.6	16.3	
Aberdeen	14.5	59.4	26.1	
Billings	15.5	60.1	24.4	
Anadarko	12.0	68.1	19.9	
Muskogee	26.6	57.0	16.4	
Math Reasoning				
Phoenix	26.5	58.4	15.1	
Albuquerque	16.7	67.7	15.6	
Aberdeen	17.7	59.8	22.5	
Billings	16.6	57.0	26.4	
Anadarko	11.3	62.3	26.4	
Muskogee	24.5	59.3	16.2	
Math Fundamentals				
Phoenix	12.0	70.5	17.5	
Albuquerque	14.4	65.2	20.4	
Aberdeen	18.6	59.5	21.9	
Billings	19.7	55.4	24.9	
Anadarko	16.7	55.5	27.8	
Muskogee	21.8	61.8	16.4	
Language				
Phoenix	29.5	59.7	10.8	
Albuquerque	15.3	66.7	18.0	
Aberdeen	16.8	66.3	16.9	
Billings	19.2	55.4	25.4	
Anadarko	11.3	66,2	22.5	
Muskogee	18.3	63.0	18.7	
Spelling				
Phoenix	22.9	53.6	23.5	
Albuquerque	19.0	59.8	21.2	
Aberdeen	13.8	57.9	28.3	
Billings	17.1	58.0	24.9	
Anadarko	16.2	59.3	24.5	
Muskogee	20.4	59.6	20.0	
Total				
Phoenix	19.8	65.1	15.1	
Albuquerque	18.0	67.5	14.5	
Aberdeen	13.8	62.4	23.8	
Billings	14.5	61.1	24.4	
Anadarko	13.0	66.2	20.8	
Muskogee	22.3	63.6	14.1	

Figure III-10
PERCENTAGES IN ACHIEVEMENT LEVELS
By Administrative Areas

Grade 10

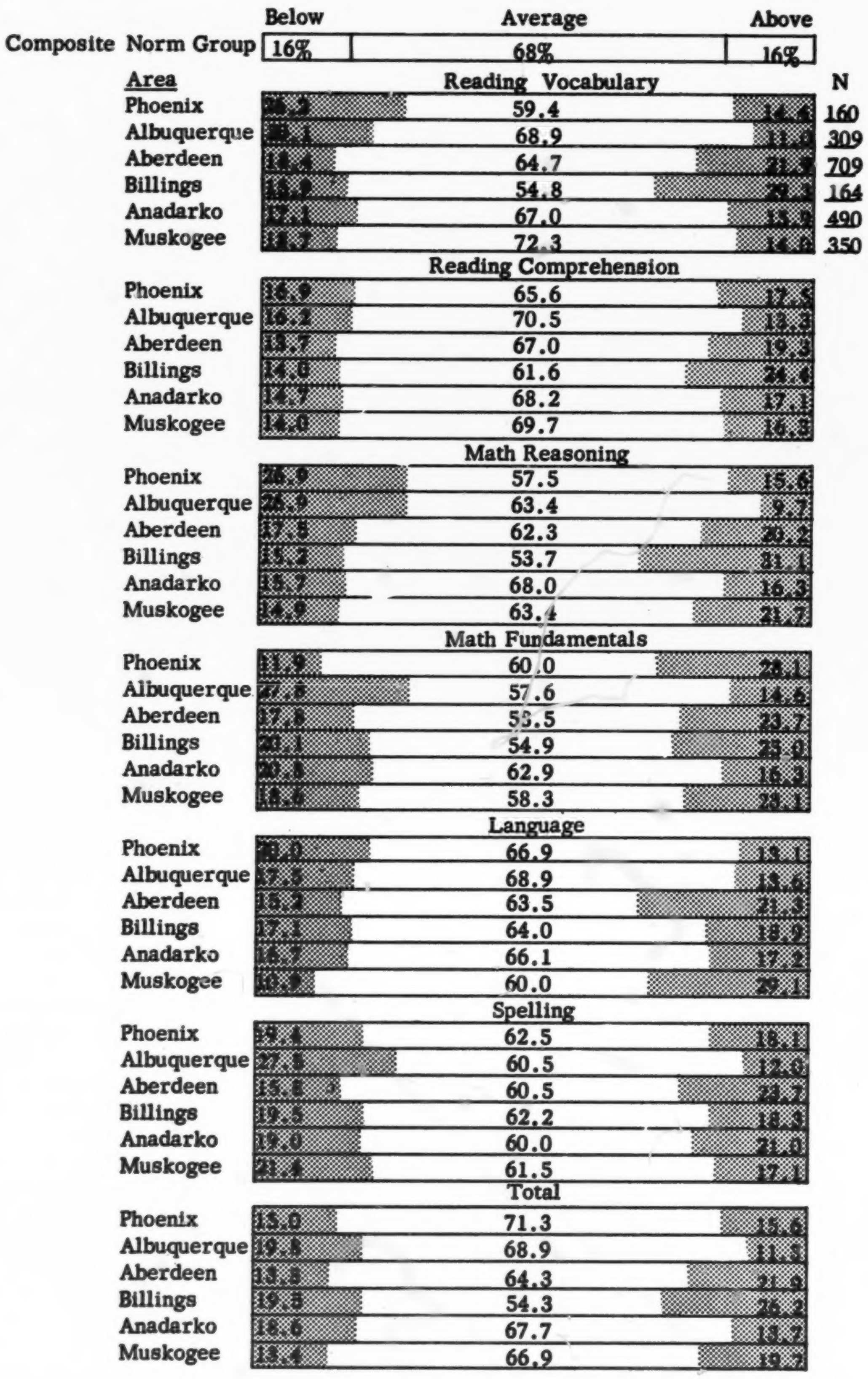
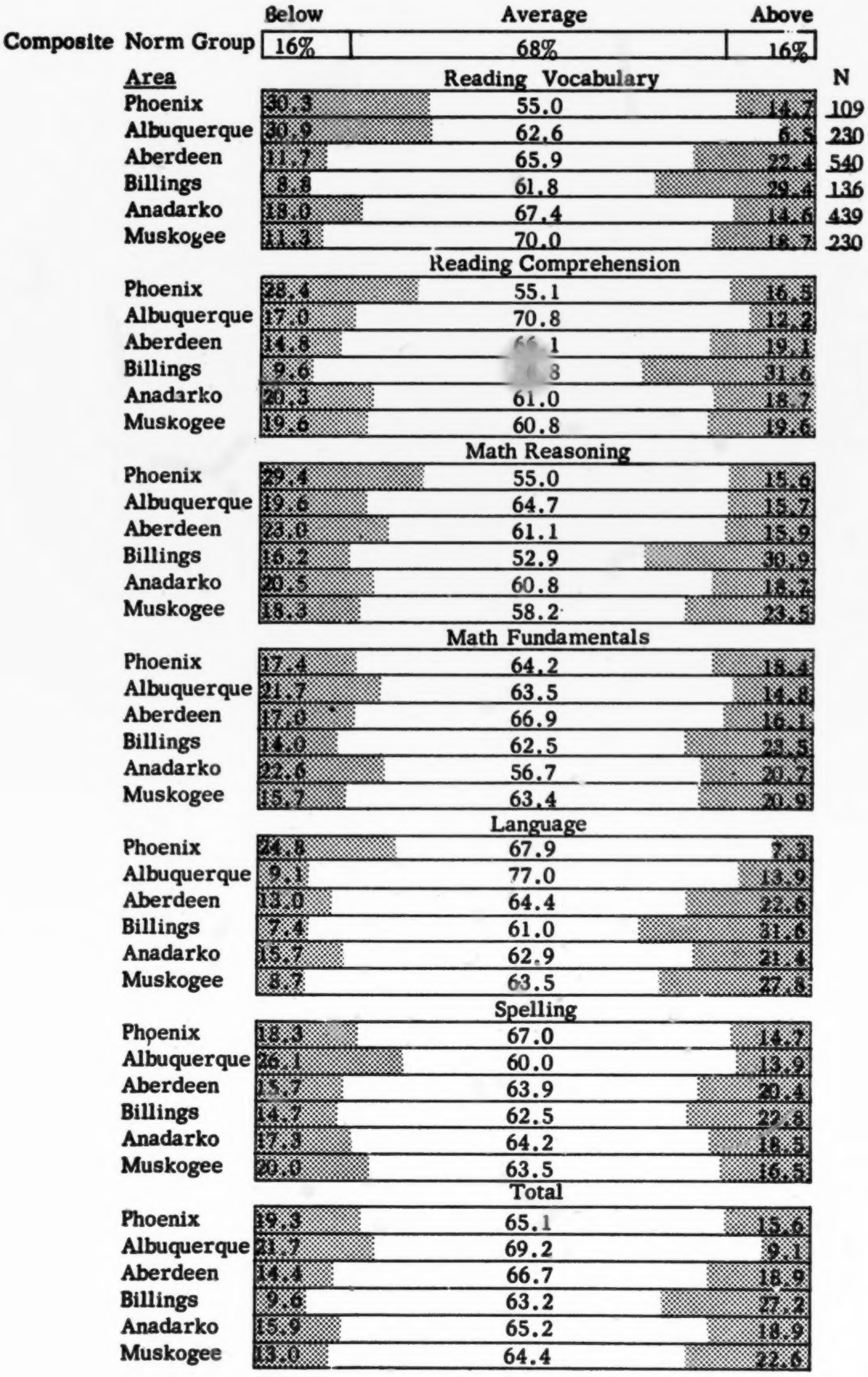


Figure III-11
PERCENTAGES IN ACHIEVEMENT LEVELS
By Administrative Areas
Grade 11



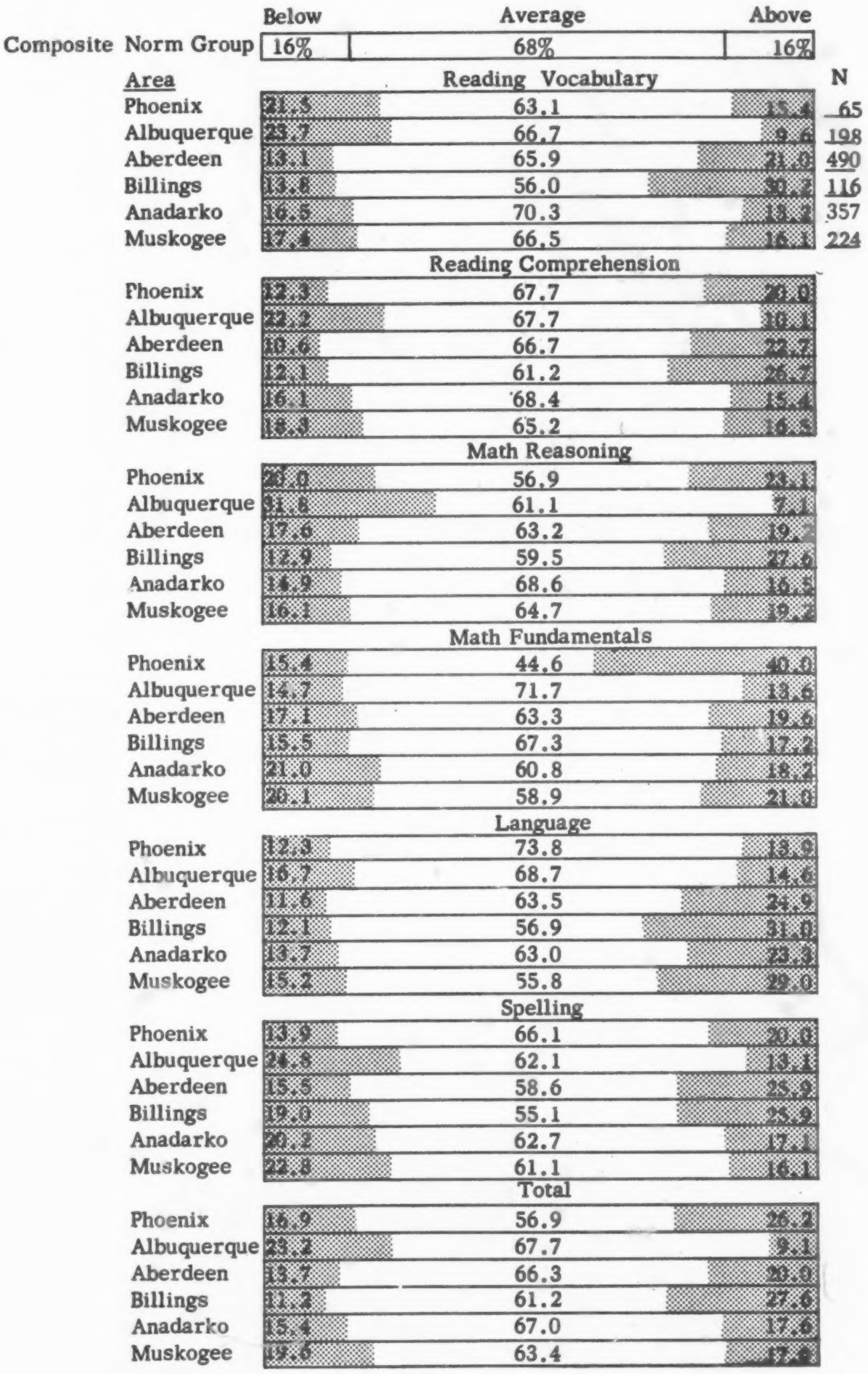
	Below	Average	Above	N
Composite Norm Group	16%	68%	16%	
Area		**Reading Vocabulary**		
Phoenix	30.3	55.0	14.7	109
Albuquerque	30.9	62.6	6.5	230
Aberdeen	11.7	65.9	22.4	540
Billings	8.8	61.8	29.4	136
Anadarko	18.0	67.4	14.6	439
Muskogee	11.3	70.0	18.7	230
		Reading Comprehension		
Phoenix	28.4	55.1	16.5	
Albuquerque	17.0	70.8	12.2	
Aberdeen	14.8	66.1	19.1	
Billings	9.6	[illegible].8	31.6	
Anadarko	20.3	61.0	18.7	
Muskogee	19.6	60.8	19.6	
		Math Reasoning		
Phoenix	29.4	55.0	15.6	
Albuquerque	19.6	64.7	15.7	
Aberdeen	23.0	61.1	15.9	
Billings	16.2	52.9	30.9	
Anadarko	20.5	60.8	18.7	
Muskogee	18.3	58.2	23.5	
		Math Fundamentals		
Phoenix	17.4	64.2	18.4	
Albuquerque	21.7	63.5	14.8	
Aberdeen	17.0	66.9	16.1	
Billings	14.0	62.5	23.5	
Anadarko	22.6	56.7	20.7	
Muskogee	15.7	63.4	20.9	
		Language		
Phoenix	24.8	67.9	7.3	
Albuquerque	9.1	77.0	13.9	
Aberdeen	13.0	64.4	22.6	
Billings	7.4	61.0	31.6	
Anadarko	15.7	62.9	21.4	
Muskogee	8.7	63.5	27.8	
		Spelling		
Phoenix	18.3	67.0	14.7	
Albuquerque	26.1	60.0	13.9	
Aberdeen	15.7	63.9	20.4	
Billings	14.7	62.5	22.8	
Anadarko	17.3	64.2	18.5	
Muskogee	20.0	63.5	16.5	
		Total		
Phoenix	19.3	65.1	15.6	
Albuquerque	21.7	69.2	9.1	
Aberdeen	14.4	66.7	18.9	
Billings	9.6	63.2	27.2	
Anadarko	15.9	65.2	18.9	
Muskogee	13.0	64.4	22.6	

Figure III-12

PERCENTAGES IN ACHIEVEMENT LEVELS

By Administrative Areas

Grade 12



Area	Below	Average	Above	N
Composite Norm Group	16%	68%	16%	
Reading Vocabulary				
Phoenix	21.5	63.1	15.4	65
Albuquerque	23.7	66.7	9.6	198
Aberdeen	13.1	65.9	21.0	490
Billings	13.8	56.0	30.2	116
Anadarko	16.5	70.3	13.2	357
Muskogee	17.4	66.5	16.1	224
Reading Comprehension				
Phoenix	12.3	67.7	20.0	
Albuquerque	22.2	67.7	10.1	
Aberdeen	10.6	66.7	22.7	
Billings	12.1	61.2	26.7	
Anadarko	16.1	68.4	15.4	
Muskogee	18.3	65.2	16.5	
Math Reasoning				
Phoenix	20.0	56.9	23.1	
Albuquerque	31.8	61.1	7.1	
Aberdeen	17.6	63.2	19.2	
Billings	12.9	59.5	27.6	
Anadarko	14.9	68.6	16.5	
Muskogee	16.1	64.7	19.2	
Math Fundamentals				
Phoenix	15.4	44.6	40.0	
Albuquerque	14.7	71.7	13.6	
Aberdeen	17.1	63.3	19.6	
Billings	15.5	67.3	17.2	
Anadarko	21.0	60.8	18.2	
Muskogee	20.1	58.9	21.0	
Language				
Phoenix	12.3	73.8	13.9	
Albuquerque	16.7	68.7	14.6	
Aberdeen	11.6	63.5	24.9	
Billings	12.1	56.9	31.0	
Anadarko	13.7	63.0	23.3	
Muskogee	15.2	55.8	29.0	
Spelling				
Phoenix	13.9	66.1	20.0	
Albuquerque	24.8	62.1	13.1	
Aberdeen	15.5	58.6	25.9	
Billings	19.0	55.1	25.9	
Anadarko	20.2	62.7	17.1	
Muskogee	22.8	61.1	16.1	
Total				
Phoenix	16.9	56.9	26.2	
Albuquerque	23.2	67.7	9.1	
Aberdeen	13.7	66.3	20.0	
Billings	11.2	61.2	27.6	
Anadarko	15.4	67.0	17.6	
Muskogee	19.6	63.4	17.0	

The achievement on "total score" of this group of children, by comparison with that of the normative population of the California Achievement Test (the "national norm" group) is shown in Figure III-13. Here achievement is expressed in terms of "grade equivalent" scores. An inspection of Figure III-13 reveals three very interesting findings. Two of these are related to reasons for developing differentiated norms. The third will be treated separately.

Difference in Achievement by Grade Based on Composite and National Norms. First, with each successive grade within a level, the mean scores of the children in the present study fell farther below the published norms of the California Achievement Test. To illustrate: since a great majority of the pupils in the present study took the test in October, or the second month of the school year, we will consider their actual grade placement to be 4.1 for fourth graders, 5.1 for fifth graders, and so on.[4] The mean, or average, score for the composite group of fourth graders fell at the 4.3 grade level and that for fifth graders at 5.0. This may be considered as not different from "normal" achievement within the meaning of the published norms. However, sixth-grade pupils were at grade 5.5 or .6 of a grade level lower than the published norms. Seventh-grade pupils were at grade 6.6, eighth graders at 7.2, a retardation of .9 of a grade level, and ninth-grade pupils at grade 7.9 or 1.1 grade levels below "normal" achievement. The comparison is even less favorable for students in the senior high school grades. Those in grade ten were achieving at grade 9.2, those in eleventh grade at 9.9, and twelfth-grade students were at grade 10.2, a retardation of 1.9 grade levels below the published norm.

What accounts for the tendency of the pupils in our present study to fall progressively lower than the published norms of the test used? The investigators do not claim to know all of the reasons, which may be many and varied. Some of the possible reasons have been discussed in Chapter I. Further reasons were indicated in more detail in the first sections of this chapter. The children tested in this study were obviously different in many aspects of cultural background and environment from those whose test scores were used to establish the published norms. This fact seriously invalidated the published norms for use with the population of the present study. The phenomenon illustrated above helps to show this lack of validity, although it may not be considered an adequate argument in itself for rejecting the use of the published norms. Since we should not consider norms as standards of achievement, to have rejected the published norms simply because our population did not achieve "up to" the level of the norms would not have been a sound technique of evaluation. However, to have used with our population norms established on a population quite different from them in many respects other than achievement would have been highly unsatisfactory. We have also pointed out that the areas in our study were culturally different enough from each other to warrant establishing separate norms for each of them. Reference to Figures III-4 to III-12 may help to show how the areas differed from each other in achievement in relation to the composite norm.

Lack of Continuity of National Norms Between Levels of the Test. A second finding which indicates the lack of validity of the published norms for use with the population of students under consideration is also illustrated in Figure III-13. It will be observed that between grades six and seven and again between grades nine and ten there is an unrealistic rise in grade equivalent scores when compared with differences at grade levels above and below them. The reader will recall that between these grade levels (six-seven and nine-ten) the test battery changes. The differences between grades four and five and grades five and six were .7 and .5 of a grade, respectively, but the difference between grades six and seven was 1.1 grades. Similarly, the difference between grades seven and eight was .6 of a grade and between grades eight and nine it was .7 of a grade, but between grades nine and ten the difference increased to 1.3 grades. In keeping with the pattern, the difference between grades ten and eleven fell to .7 of a grade and between grades eleven and twelve dropped to a mere .3 of a grade level. Almost without exception, whenever this type of graph was

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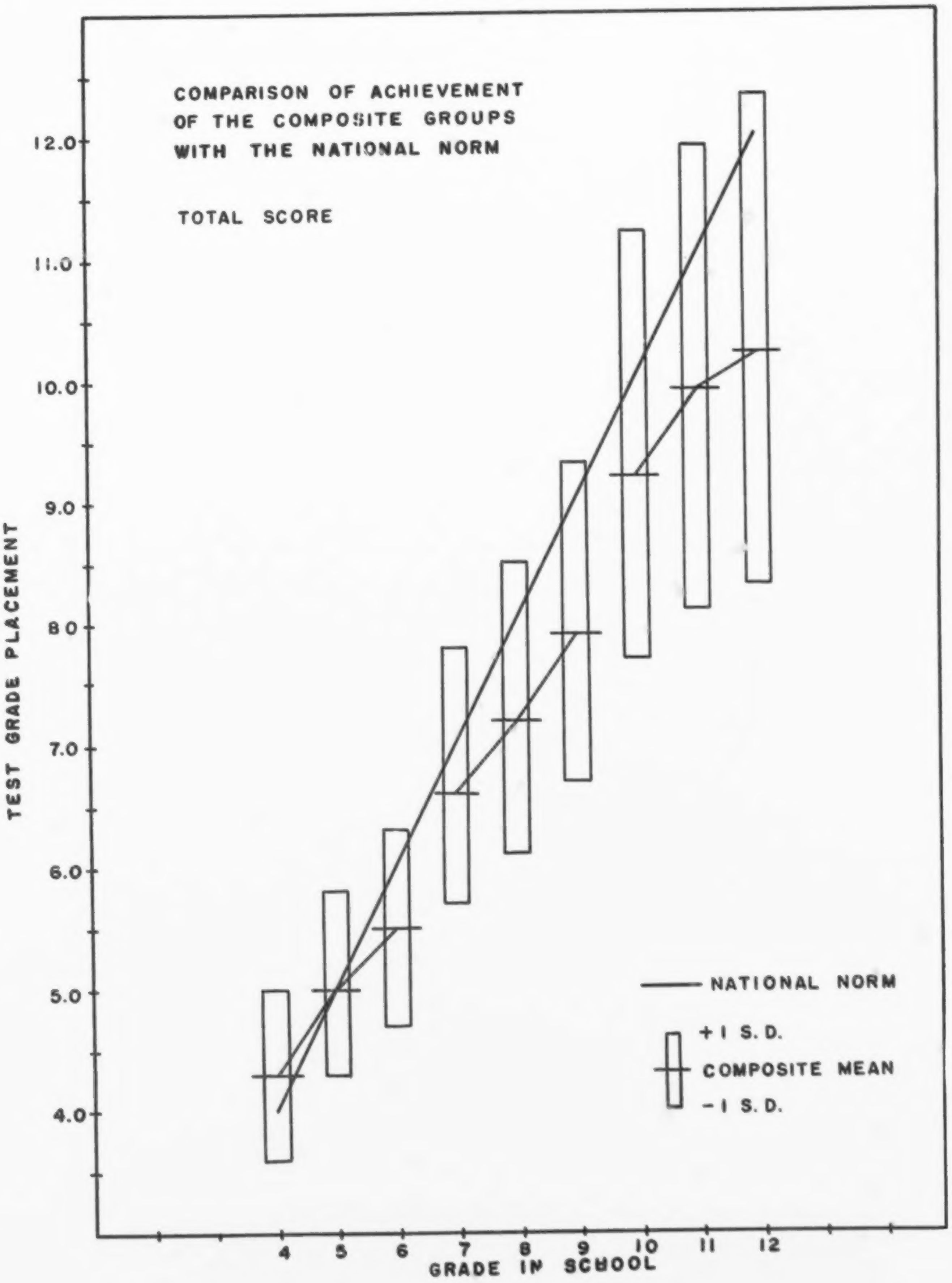
[4] California Achievement Test Manual, Elementary Level, p. 7.

Figure III-13



drawn for any group in the present population, on any skill, this phenomenon occurred. The investigators do not pretend to know the reason for this unless it tends to occur with a population which generally achieves lower than the normative population of this particular test or is an artifact of the method of standardization. This function of the published norms was noticed by the investigators in the case of separate areas long before a composite mean was computed and was a principal reason for the early decision to establish separate or differentiated norms.

Increasing Variability With Upper Grades

The third finding, which merely confirms the findings of many earlier studies, has to do with the variability of scores of the several grade populations. The vertical bars in Figure III-13 indicate the range of achievement between plus-and-minus one standard deviation from the mean for each of the grades. It will be observed that the range is progressively larger as the higher grades are reached. Children in a grade tend to be less like each other in achievement the farther they go in school.

CHAPTER IV

A COMPARISON OF THE ACHIEVEMENT OF PUPILS BY RACE-SCHOOL GROUPS

WHAT IS BEING COMPARED?

It is natural and inevitable, we suppose, that people generally should be interested in comparing school children of different races with each other. Certainly any teacher who has worked very long with Indian children is accustomed to being asked by interested or merely curious laymen to make such comparisons. Most often the teacher is asked whether the Indian pupil is as intelligent as his white classmate. This is indeed a difficult question to answer, for the inquirer usually has no intention of sitting patiently while the teacher explains that anthropologists and ethnologists are pretty well agreed that race alone is not a determining factor in intelligence and that no one race has a monopoly on all the brains in the world. The questioner becomes increasingly restless as the teacher goes on to say that we have no really suitable tests for measuring the intelligence of Indian pupils since the ones available are based largely on English verbalism and are loaded with questions pertaining to the dominant culture of the country. The chances are good that all the questioner really wanted to know was whether Indian children do "as well" in school as non-Indian children. Many laymen tend to equate school success with intelligence; that is, they assume that intelligence is the sole factor which influences learning. This is far from true. Some of the other factors which are believed to influence learning will be discussed in Chapter VI.

In any case no intelligence test data were obtained in the present study. The tests used were achievement tests. Achievement tests seek to measure how much or how well a child has learned. Intelligence tests attempt to discover his mental capacity for learning.

Why Intelligence Tests Were Not Given

Some readers may feel that, inasmuch as intelligence is admittedly an important factor in the learning process, not attempting to measure it was a serious omission. The plain fact is that, in the opinion of the investigators, a valid measurement of the intelligence of pupils was not possible in the present study. First of all, it would have been necessary to use a group test which could have been scored by machine. Furthermore it would have had to be usable for children from age nine years to adulthood. Nearly all group intelligence tests are highly verbal. Those which claim to be non-verbal in content must rely on verbalism in the giving of directions. Nearly all intelligence tests, individual as well as those of the group type, contain items drawn from the major culture of the country. This, it was felt, would operate against the underacculturated groups in the study, both Indian and white. No instrument was found which satisfied all of the requirements and contained none of the disadvantages mentioned above.

Differences in the Measuring of Intelligence and Achievement

We accept the concept of innate mental capacity, which differs qualitatively and quantitatively from individual to individual, as a valid one. It would be very helpful in educational situations if we could measure it as such. In truth, however, we have never been able to do this. From the moment of birth environmental influences begin to act upon the individual. These do not change his innate capacity but they prevent the accurate measurement of it. The same language handicaps or other cultural disadvantages which adversely affect the educational achievement of a child would tend to influence his intelligence test scores. Achievement tests on the other hand are designed to cover material which presumably has been "taught" in school. By use of them we simply seek to discover how much the child has **learned**. They are not invalidated merely because the learner faces learning disadvantages, so long as the content is consistent with the courses of study and the learning goals of the school which the child attends. No such validity can be claimed for a verbalized, culture laden, group test which purports to measure the **innate** mental capacity of an under-acculturated child.

THE COMPOSITION OF THE RACE-SCHOOL GROUPS

As was described in Chapter II, the population of Indian children in the present study was composed of pupils in three different types of schools: Federal, public, and mission. Through the generous and excellent help of many public and mission school administrators and teachers, rather large numbers of Indian pupils were tested in both public and mission schools, as well as a large number of white children in public schools. Table 4-a shows the composition of the entire population tested by areas, grades, and race-school groups.

Does Type of School Administration Affect Achievement?

Again it is inevitable that there should be interest in the relative levels of achievement of Indian pupils in the three types of schools. There is a rather popular supposition that these school types differ from each other quite radically in point of curriculum, qualifications of teachers, teaching methods and materials, and educational goals, simply because they operate under separate administrative authorities. These differences are more often imaginary than real as anyone who takes the trouble to investigate will discover. This is particularly true for the elementary grades and for the basic skills which were measured in this study. It would be more logical and accurate to assume, unless there is strong evidence to the contrary, that all three types of schools draw upon the common pool of educational "know how" which has been developed in American schools.

Of course, it is necessary for the school, of whichever administrative type it may be, to modify its instructional program to meet the needs of those pupils who enter school unable to speak any English or who speak it poorly. Federal schools in the Phoenix, Albuquerque, Billings, and Muskogee Area have a high percentage of such beginning pupils as do mission schools in the Phoenix and Albuquerque Areas. Public schools have faced this problem less frequently than have the Federal and mission schools. It is mandatory that instructional procedures, techniques, and materials be adapted to the needs of the non-English-speaking beginner.

THE ORDER OF ACHIEVEMENT OF RACE-SCHOOL GROUPS

Nevertheless, and in spite of what has been pointed out in the section just preceding, the four race-school groups do arrange themselves into a fairly definite hierarchy or order of achievement as follows:

1. **White children in public schools**
2. **Indian children in public schools**
3. **Indian children in Federal schools**
4. **Indian children in mission schools**

Method of Establishing the Hierarchy

Table 4-b shows the hierarchy for each of the areas separately. These were determined by exactly the same method employed in Chapter III in determining the hierarchy of achievement for the six areas. Here a comparison was made of the mean raw scores of the race-school groups for each of the six skills, and total score, for each of the nine grades in each area. One minor exception to this occurred in the Billings Area where there were no

TABLE 4-a

TOTAL POPULATION OF THE STUDY SHOWN BY AREAS, RACE, AND KIND OF SCHOOL ATTENDED

PHOENIX AREA

		INDIAN							WHITE		
Grade	Federal School	Public School	Mission School	Total	Percent Indian	Grand Total	Percent White	Public School	Mission School	Federal School	Total
4	190	47	65	302	79.9	378	20.1	75	1	0	76
5	186	34	56	276	79.3	348	30.7	70	1	1	72
6	154	40	78	272	79.5	342	20.5	62	8	0	70
7	184	17	61	262	86.2	304	13.8	41	1	0	42
8	148	17	65	230	82.1	280	17.9	50	0	0	50
9	58	19	45	122	73.1	167	26.9	44	1	0	45
10	91	15	22	128	80.0	160	20.0	32	0	0	32
11	55	10	15	80	73.4	109	26.6	29	0	0	29
12	31	4	13	48	73.8	65	26.2	17	0	0	17
Total	1097	203	420	1720	79.9	2153	20.1	420	12	1	433

ALBUQUERQUE AREA

		INDIAN							WHITE		
Grade											
4	343	16	38	397	56.2	706	43.8	307	0	2	309
5	280	13	51	344	58.4	589	41.6	242	0	3	245
6	300	26	66	392	59.4	660	40.6	266	1	1	268
7	252	68	68	388	54.3	714	45.7	300	24	2	326
8	233	47	56	336	48.8	688	51.2	316	35	1	352
9	220	49	11	280	41.2	680	58.8	347	53	0	400
10	156	23	12	191	52.6	363	47.4	118	53	1	172
11	122	22	11	155	61.3	253	38.7	75	23	0	98
12	79	16	13	108	47.4	228	52.6	90	30	0	120
Total	1985	280	326	2591	53.1	4881	46.9	2061	219	10	2290

ABERDEEN AREA

		INDIAN							WHITE		
Grade											
4	504	111	148	763	69.4	1099	30.6	298	28	10	336
5	476	104	148	728	67.2	1084	32.8	316	22	18	356
6	459	105	142	706	68.4	1032	31.6	280	22	24	326
7	431	95	127	653	66.4	984	33.6	294	25	12	331
8	417	69	104	590	65.7	898	34.3	268	25	15	308
9	300	62	96	458	58.7	780	41.3	305	10	7	322
10	238	87	105	430	55.8	771	44.2	317	15	9	341
11	168	57	13	238	46.2	515	53.8	263	0	14	277
12	152	43	40	235	47.2	498	52.8	255	5	3	263
Total	3145	733	923	4801	62.7	7661	37.3	2596	152	112	2860

TABLE 4-a (continued)

BILLINGS AREA

	INDIAN							WHITE			
Grade	Federal School	Public School	Mission School	Total	Percent Indian	Grand Total	Percent White	Public School	Mission School	Federal School	Total
4	44	206	44	294	65.3	450	34.7	155	0	1	156
5	57	172	52	281	62.6	449	37.4	164	4	0	168
6	33	153	57	243	61.5	395	38.5	151	1	0	152
7	28	197	50	275	67.6	407	32.4	129	3	0	132
8	13	129	30	172	61.2	281	38.8	107	2	0	109
9	11	70	33	114	56.2	203	43.8	82	7	0	89
10	7	53	20	80	46.5	172	53.5	84	7	1	92
11	2	35	12	49	35.0	140	65.0	87	4	0	91
12	2	34	11	47	38.5	122	61.5	69	6	0	75
Total	197	1049	309	1555	59.4	2619	40.6	1028	34	2	1064

MUSKOGEE AREA

	INDIAN							WHITE			
Grade											
4	117	69	0	186	52.2	356	47.8	170	0	0	170
5	84	81	0	165	45.5	363	54.5	196	0	2	198
6	105	87	0	192	49.5	388	50.5	195	0	1	196
7	110	79	0	189	49.0	386	51.0	197	0	0	197
8	102	70	0	172	44.8	384	55.2	211	0	1	212
9	117	106	0	223	39.5	564	60.5	341	0	0	341
10	53	48	0	101	28.9	350	71.1	249	0	0	249
11	30	41	0	71	27.2	261	72.8	190	0	0	190
12	31	23	0	54	21.1	256	78.9	202	0	0	202
Total	749	604	0	1353	40.1	3308	59.1	1951	0	4	1955

ANADARKO AREA

	INDIAN							WHITE			
Grade											
4	49	35	0	84	38.7	217	61.3	133	0	0	133
5	52	41	0	93	38.1	244	61.9	151	0	0	151
6	44	26	0	70	37.0	189	63.0	119	0	0	119
7	106	38	0	144	55.2	261	44.8	116	0	1	117
8	125	35	0	160	47.9	334	52.1	172	0	2	174
9	224	39	0	263	59.8	440	40.2	171	0	6	177
10	317	20	0	337	67.7	498	32.3	154	0	7	161
11	256	25	0	281	63.1	445	36.9	158	0	6	164
12	218	16	0	234	65.4	358	34.6	123	0	1	124
Total	1391	275	0	1666	55.8	2986	44.2	1297	0	23	1320

Federal school pupils in grades eleven and twelve, and so they could be compared with the other race-school groups only through grade ten. Normalized standard scores were assigned to the ranks of the means for race-school groups in each grade. These scores were then averaged for each group. Except where noted in Table 4-b, differences between the means of standardized scores assigned to race-school groups were statistically significant.[1]

Two Exceptions to the General Hierarchy

An inspection of Table 4-b will reveal that the Phoenix and Billings Areas **conform exactly** to the general hierarchy outlined above. So do the Anadarko and Muskogee Areas, except that there were no mission school pupils tested in those areas.

In the Aberdeen and Albuquerque Areas, however, exceptions to the general hierarchy of achievement do occur. In the Aberdeen Area the over-all achievement of Indian pupils in mission schools did not differ significantly from that of Indian pupils in public schools. Both groups were significantly lower than white pupils in public schools and significantly higher than Indian pupils in Federal schools. In the Albuquerque Area, again there was no significant difference in the over-all achievement of the Indian groups in mission and public schools, but the Indian pupils in Federal schools were significantly higher than both. They, in turn, were significantly lower than the white pupils in public schools. Data shown and discussed later in Chapter VI will suggest partial explanations for these departures from the general hierarchy.

Tables of raw score means and tables of differences in means among the race-school groups are shown in Appendix C. These are shown by areas, by grades, and by skills. A careful examination of these tables by the reader will disclose that they support the hierarchies as shown in Table 4-b. Raw score mean differences which are statistically significant are so indicated.

SHOWING DIFFERENCES BY SKILLS AND BY GRADES

It must be remembered that the hierarchy of achievement referred to above rests upon comparisons of the race-school groups on seven different skills in nine different grades: sixty-three in all for each area. The hierarchy of achievement, then, is a **general** one and simply reflects the rank ordering of race-school groups which was most typical of these comparisons. In many of the sixty-three comparisons in each area, the order of achievement was different from the general hierarchy.

Average, and Below and Above Average Pupils, Shown by Percentages

The writers hope that in Figures IV-1 through IV-42 a more meaningful method of depicting differences in achievement among the several race-school groups has been found than would result from an examination of the bare tables of raw-score means. In these figures much the same scheme is employed as was used in Figures III-4 through III-12 in the preceding chapter. The principal difference is that here the various race-school groups are compared, within each area, with the norm group of that area. Such norm groups are composed of all the children tested in a given grade in that area. In Figures III-4 through III-12, it will be recalled, a composite norm group made up of all the children in a grade in this study was used for purposes of comparing achievement in the several areas.

Let us use Figure IV-1 as an example. We will consider the middle 68 percent of the scores of all the fourth-grade students who were tested on reading vocabulary in the Phoenix Area to be average, the lowest 16 percent to be below average, and the highest 16 percent to be above average. By comparison, then, we reach the following conclusion about the white pupils who attended the fourth grade in public schools: 53.3 percent were average, 18.7 percent were below average, and 28 percent were above average.

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[1] At the .01 level of confidence.

TABLE 4-b

HIERARCHY OF EDUCATIONAL ACHIEVEMENT BY RACE-SCHOOL GROUPS IN SIX ADMINISTRATIVE AREAS OF THE BUREAU OF INDIAN AFFAIRS

PHOENIX AREA

1. White pupils in public schools
2. Indian pupils in public schools
3. Indian pupils in Federal schools
4. Indian pupils in mission schools

ABERDEEN AREA

1. White pupils in public schools
2-3 Indian pupils in mission schools) No significant
Indian pupils in public schools) difference
4. Indian pupils in Federal schools

MUSKOGEE AREA

1. White pupils in public schools
2. Indian pupils in public schools
3. Indian pupils in Federal schools

BILLINGS AREA

1. White pupils in public schools
2. Indian pupils in public schools
3. Indian pupils in Federal schools
4. Indian pupils in mission schools

ALBUQUERQUE AREA

1. White pupils in public schools
2. Indian pupils in Federal schools
3-4 Indian pupils in public schools) No significant
Indian pupils in mission schools) difference

ANADARKO AREA

1. White pupils in public schools
2. Indian pupils in public schools
3. Indian pupils in Federal schools

Variations in Rank and Percentages; Overlapping Achievement of Pupils

An examination of these figures will reveal that the relative positions of the several race-school groups differ from the general hierarchy on certain skills and in certain grades. It will further disclose that the percentages of pupils who are average, or above or below average, differ for each race-school group from skill to skill and from grade to grade. And, finally, the reader will observe the overlap in level of achievement among pupils of the different groups, with some pupils in each group achieving higher or lower than some pupils in each of the other groups.

IMPLICATIONS OF THE GENERAL HIERARCHY

What are some of the implications of the general hierarchy of achievement of the race-school groups? An obvious one is that generally the basic skills of Indian pupils are not yet as well developed as are those of white children. This is not a new finding, for the studies by Peterson[2] and by Anderson,[3] et al, revealed the same thing.

In general, also, Indian children attending public schools achieved higher in the basic skills than did those attending Federal or mission schools, although notable exceptions to this pattern have been observed in the Albuquerque and Aberdeen Areas. What accounts for the general superiority in achievement of public school Indian pupils over the other two groups? Is it because the public schools are "better" schools? Are public school Indian pupils "better taught?" There are always persons who are quick to leap to such a conclusion even though no reputable accrediting agency evaluates the quality of a school on the basis of the scores its pupils make on a standardized achievement test. Accrediting agencies recognize that in different schools the pupils themselves may vary widely in point of cultural background. Accrediting agencies, rather, establish certain evaluative criteria,[4] concerning such things as professional training of teachers, curricula, and teaching materials, which they believe to be the hallmarks of a good school. To the extent that a school measures up to these criteria, or falls short of them, it is considered a good school or a poor one.

The Quality of the School

Of course, some schools are of much better quality than others. These differences are very wide and they occur over the entire United States in all types of schools. Usually the quality of the school is of the sort that the people of the local community demand and can or will pay for. To assume, however, that a school of a given administrative type possesses or lacks qualities of excellence, per se, is to stray far wide of the mark.

Difference in Cultural Background

Some differences in cultural background of the three Indian groups in this study will be discussed in detail in Chapter VI. These differences, in the opinion of the writers, have more to do with level of achievement than does mere attendance in a school of a certain administrative type.

Inter-Area Comparisons

The comparison of achievement of the several race-school groups need not stop at area boundary lines. It is very enlightening to make inter-area comparisons. For example, the average achievement of Indian pupils in Federal schools in the Muskogee and Aberdeen Areas coincides almost exactly at every grade level. On the other hand the average achievement of white pupils in public schools in the Aberdeen Area was significantly higher at

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[2] Shailer Peterson. 1948. **How Well Are Indian Children Educated?** Haskell Institute Press.

[3] Kenneth E. Anderson, E. Gordon Collister and Carl E. Ladd. 1953. **The Educational Achievement of Indian Children.** Haskell Institute Press.

[4] For example, the **Evaluative Criteria** established by the Cooperative Study of Secondary School Standards and used by such accrediting agencies as the North Central Association of Colleges and Secondary Schools.

Figure IV-1

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Reading Vocabulary

Phoenix Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	16.3	65.8	17.9	190
Public Whites	18.7	53.3	28.0	75
Public Indian	14.9	66.0	19.1	47
Mission Indian	26.1	63.1	10.8	65
Grade 5				
Federal Indian	8.1	67.7	24.2	186
Public Whites	5.7	52.9	41.4	70
Public Indian	20.6	52.9	26.5	34
Mission Indian	17.8	66.1	16.1	56
Grade 6				
Federal Indian	9.1	75.3	15.6	154
Public Whites	14.5	53.2	32.3	62
Public Indian	10.0	67.5	22.5	40
Mission Indian	20.5	71.8	7.7	78
Grade 7				
Federal Indian	14.7	71.2	14.1	184
Public Whites	7.3	41.5	51.2	41
Public Indian	11.8	70.6	17.6	17
Mission Indian	18.0	72.1	9.9	61
Grade 8				
Federal Indian	8.1	80.4	11.5	148
Public Whites	2.0	54.0	44.0	50
Public Indian		52.9	47.1	17
Mission Indian	20.0	75.4	4.6	65
Grade 9				
Federal Indian	27.6	65.5	6.9	58
Public Whites	2.3	61.3	36.4	44
Public Indian	5.3	68.4	26.3	19
Mission Indian	15.6	66.7	17.7	45
Grade 10				
Federal Indian	15.4	81.3	3.3	91
Public Whites	6.3	50.0	43.7	32
Public Indian	6.7	53.3	40.0	15
Mission Indian	31.8	63.7	4.5	22
Grade 11				
Federal Indian	21.8	74.5	3.7	55
Public Whites	6.9	34.5	58.6	29
Public Indian	30.0	50.0	20.0	10
Mission Indian	13.3	86.7		15
Grade 12				
Federal Indian	19.4	77.4	3.2	31
Public Whites		41.2	58.8	17
Public Indian	25.0	50.0	25.0	4
Mission Indian	30.8	53.8	15.4	13

Figure IV-2

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Reading Comprehension

Phoenix Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	20.0	65.8	14.2	190
Public Whites	12.0	72.0	16.0	75
Public Indian	14.9	68.1	17.0	47
Mission Indian	27.7	66.2	6.1	65
Grade 5				
Federal Indian	22.6	64.0	13.4	186
Public Whites	7.1	60.0	32.9	70
Public Indian	20.6	73.5	5.9	34
Mission Indian	25.0	67.9	7.1	56
Grade 6				
Federal Indian	18.2	69.5	12.3	154
Public Whites	8.1	58.0	33.9	62
Public Indian	5.0	72.5	22.5	40
Mission Indian	20.5	69.2	10.3	78
Grade 7				
Federal Indian	14.1	73.4	12.5	184
Public Whites	2.4	48.8	48.8	41
Public Indian		64.7	35.3	17
Mission Indian	22.9	68.9	8.2	61
Grade 8				
Federal Indian	5.4	85.8	8.8	148
Public Whites	4.0	60.0	36.0	50
Public Indian		76.5	23.5	17
Mission Indian	20.0	76.9	3.1	65
Grade 9				
Federal Indian	31.0	58.6	10.4	58
Public Whites	15.9	43.2	40.9	44
Public Indian	15.8	63.1	21.1	19
Mission Indian	22.2	71.1	6.7	45
Grade 10				
Federal Indian	12.1	70.3	17.6	91
Public Whites	9.4	56.2	34.4	32
Public Indian		66.7	33.3	15
Mission Indian	40.9	59.1		22
Grade 11				
Federal Indian	29.1	60.0	10.9	55
Public Whites	6.9	44.8	48.3	29
Public Indian	40.0	60.0		10
Mission Indian	13.3	80.0	6.7	15
Grade 12				
Federal Indian	29.0	54.8	16.2	31
Public Whites		64.7	35.3	17
Public Indian	25.0	50.0	25.0	4
Mission Indian	7.7	84.6	7.7	13

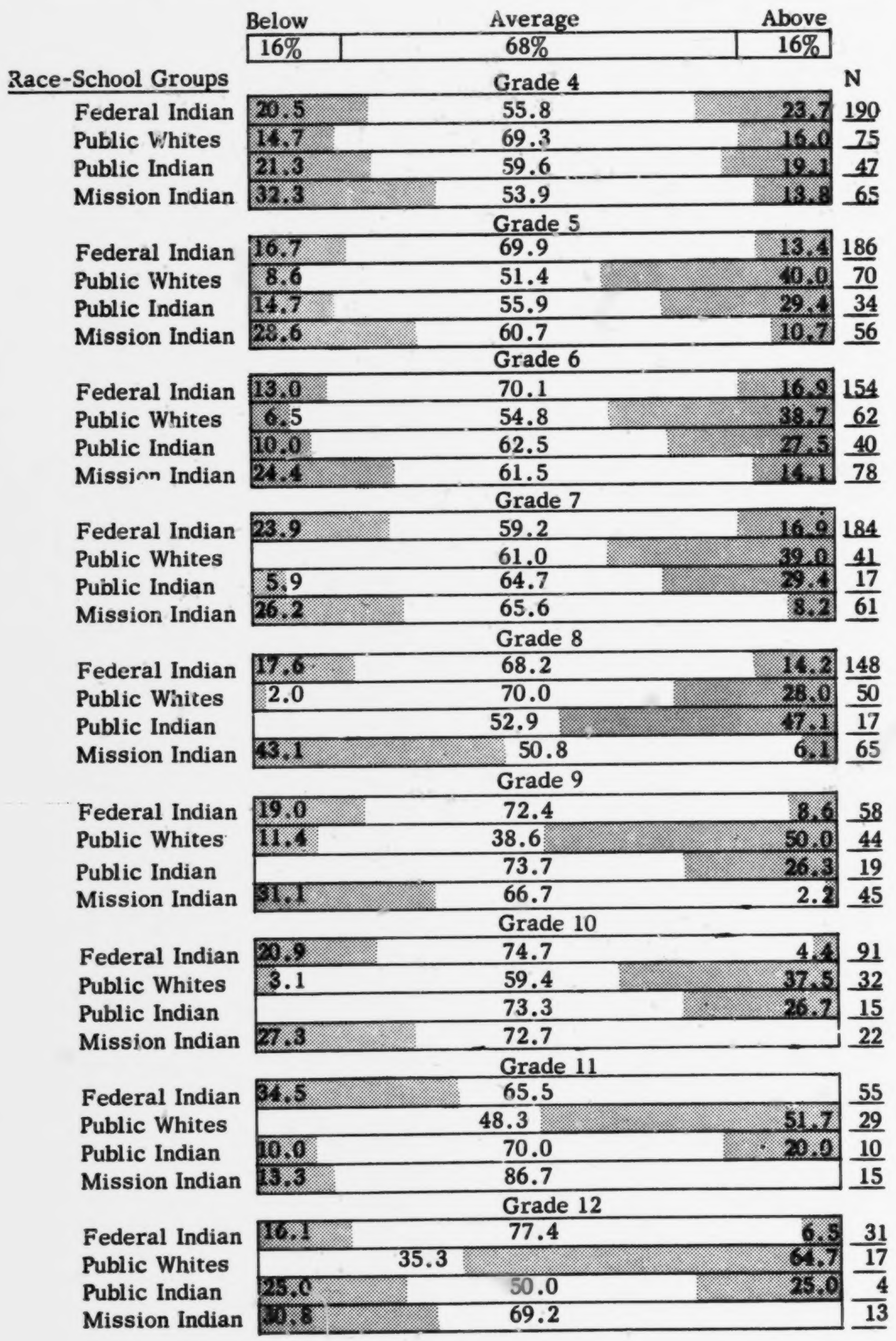
8

Figure IV-3

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Arithmetic Reasoning

Phoenix Area



Race-School Groups	Below	Average	Above	N
Grade 4				
Federal Indian	20.5	55.8	23.7	190
Public Whites	14.7	69.3	16.0	75
Public Indian	21.3	59.6	19.1	47
Mission Indian	32.3	53.9	13.8	65
Grade 5				
Federal Indian	16.7	69.9	13.4	186
Public Whites	8.6	51.4	40.0	70
Public Indian	14.7	55.9	29.4	34
Mission Indian	28.6	60.7	10.7	56
Grade 6				
Federal Indian	13.0	70.1	16.9	154
Public Whites	6.5	54.8	38.7	62
Public Indian	10.0	62.5	27.5	40
Mission Indian	24.4	61.5	14.1	78
Grade 7				
Federal Indian	23.9	59.2	16.9	184
Public Whites		61.0	39.0	41
Public Indian	5.9	64.7	29.4	17
Mission Indian	26.2	65.6	8.2	61
Grade 8				
Federal Indian	17.6	68.2	14.2	148
Public Whites	2.0	70.0	28.0	50
Public Indian		52.9	47.1	17
Mission Indian	43.1	50.8	6.1	65
Grade 9				
Federal Indian	19.0	72.4	8.6	58
Public Whites	11.4	38.6	50.0	44
Public Indian		73.7	26.3	19
Mission Indian	31.1	66.7	2.2	45
Grade 10				
Federal Indian	20.9	74.7	4.4	91
Public Whites	3.1	59.4	37.5	32
Public Indian		73.3	26.7	15
Mission Indian	27.3	72.7		22
Grade 11				
Federal Indian	34.5	65.5		55
Public Whites		48.3	51.7	29
Public Indian	10.0	70.0	20.0	10
Mission Indian	13.3	86.7		15
Grade 12				
Federal Indian	16.1	77.4	6.5	31
Public Whites		35.3	64.7	17
Public Indian	25.0	50.0	25.0	4
Mission Indian	30.8	69.2		13

Figure IV-4

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Arithmetic Fundamentals

Phoenix Area

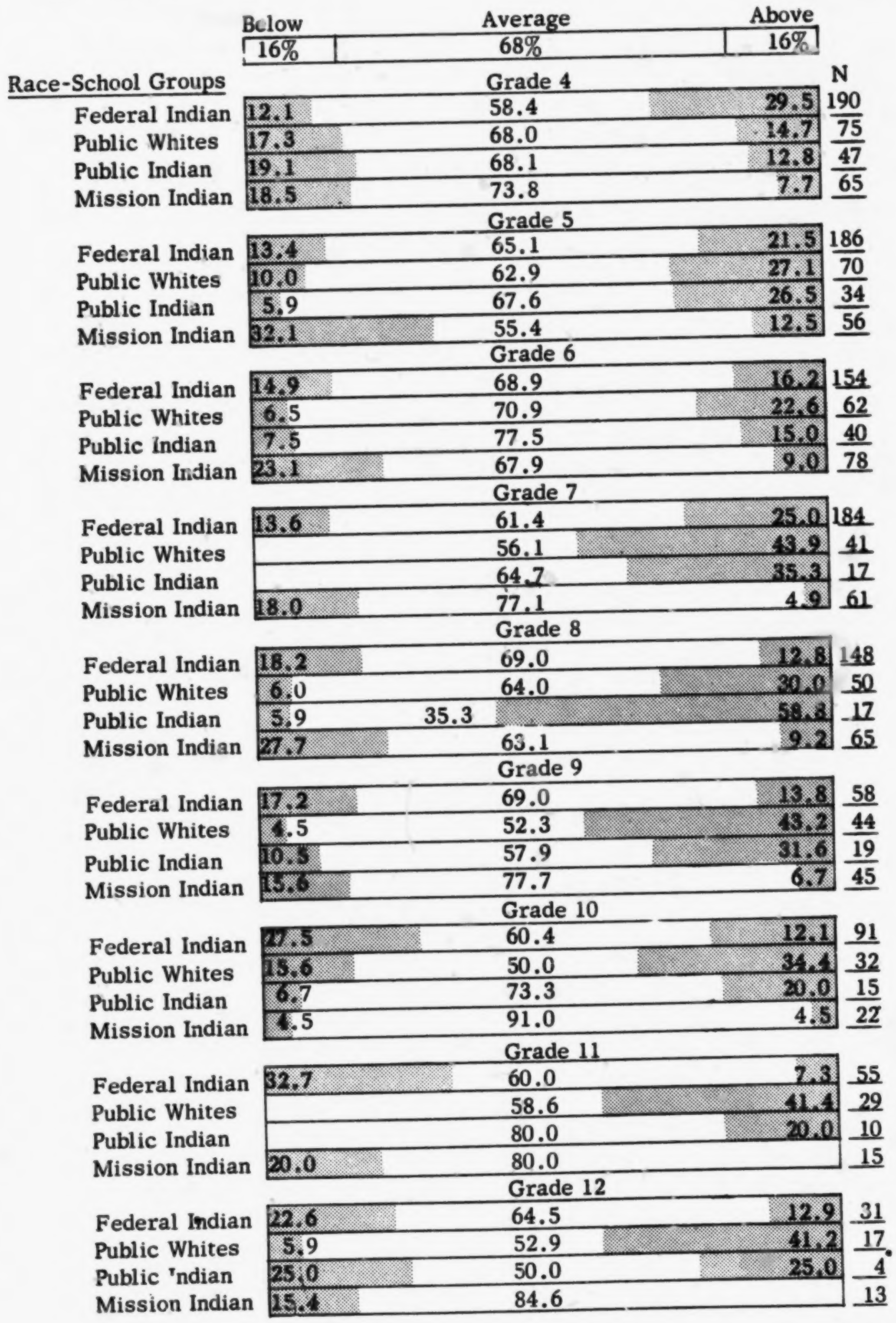


Figure IV-5

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Language | Phoenix Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	20.0	65.8	14.2	190
Public Whites	14.7	64.0	21.3	75
Public Indian	19.1	42.6	38.3	47
Mission Indian	33.8	55.4	10.8	65
Grade 5				
Federal Indian	18.8	64.0	17.2	186
Public Whites	15.7	52.9	31.4	70
Public Indian	8.8	73.6	17.6	34
Mission Indian	16.1	76.8	7.1	56
Grade 6				
Federal Indian	12.3	68.9	18.8	154
Public Whites	9.7	41.9	48.4	62
Public Indian	7.5	67.5	25.0	40
Mission Indian	24.4	66.7	8.9	78
Grade 7				
Federal Indian	16.8	69.1	14.1	184
Public Whites	4.9	51.2	43.9	41
Public Indian	11.8	64.7	23.5	17
Mission Indian	19.7	68.9	11.4	61
Grade 8				
Federal Indian	14.9	75.0	10.1	148
Public Whites	4.0	58.0	38.0	50
Public Indian		70.6	29.4	17
Mission Indian	33.8	58.5	7.7	65
Grade 9				
Federal Indian	44.8	50.0	5.2	58
Public Whites	9.1	40.9	50.0	44
Public Indian	10.5	73.7	15.8	19
Mission Indian	22.2	66.7	11.1	45
Grade 10				
Federal Indian	19.8	68.1	12.1	91
Public Whites	31.3	46.9	21.8	32
Public Indian	13.3	66.7	20.0	15
Mission Indian	9.1	81.8	9.1	22
Grade 11				
Federal Indian	27.3	69.0	3.7	55
Public Whites	6.9	51.7	41.4	29
Public Indian	30.0	60.0	10.0	10
Mission Indian	20.0	80.0		15
Grade 12				
Federal Indian	29.0	71.0		31
Public Whites	5.9	52.9	41.2	17
Public Indian	25.0	50.0	25.0	4
Mission Indian	30.8	61.5	7.7	13

Figure IV-6

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Spelling

Phoenix Area

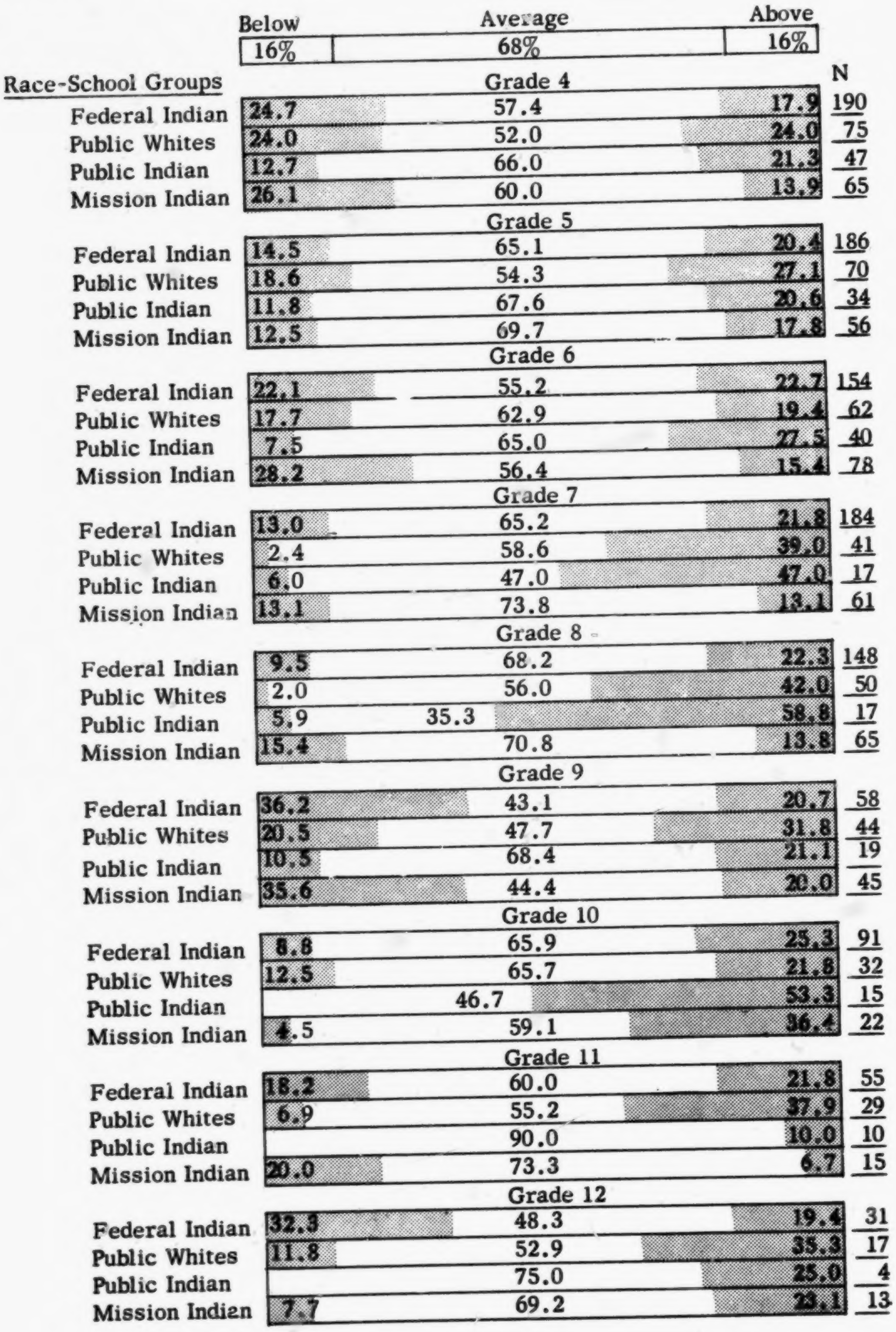


Figure IV-7

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Total Score

Phoenix Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	17.9	65.3	16.8	190
Public Whites	16.0	68.0	16.0	75
Public Indian	19.1	63.9	17.0	47
Mission Indian	35.4	55.4	9.2	65
Grade 5				
Federal Indian	17.1	69.0	13.9	186
Public Whites	7.1	62.9	30.0	70
Public Indian	11.8	70.6	17.6	34
Mission Indian	23.2	66.1	10.7	56
Grade 6				
Federal Indian	11.1	73.9	15.0	154
Public Whites	9.7	62.9	27.4	62
Public Indian	7.5	72.5	20.0	40
Mission Indian	25.6	64.1	10.3	78
Grade 7				
Federal Indian	14.1	66.3	19.6	184
Public Whites	7.3	43.9	48.8	41
Public Indian	5.9	52.9	41.2	17
Mission Indian	21.3	70.5	8.2	61
Grade 8				
Federal Indian	13.5	76.4	10.1	148
Public Whites	4.0	58.0	38.0	50
Public Indian		52.9	47.1	17
Mission Indian	27.7	69.2	3.1	65
Grade 9				
Federal Indian	24.1	70.7	5.2	58
Public Whites	9.0	45.5	45.5	44
Public Indian		78.9	21.1	19
Mission Indian	26.7	68.9	4.4	45
Grade 10				
Federal Indian	19.8	70.3	9.9	91
Public Whites	9.4	53.1	37.5	32
Public Indian	6.7	53.3	40.0	15
Mission Indian	9.0	91.0		22
Grade 11				
Federal Indian	32.7	67.3		55
Public Whites	3.5	37.9	58.6	29
Public Indian	20.0	70.0	10.0	10
Mission Indian		100.0		15
Grade 12				
Federal Indian	25.8	61.3	12.9	31
Public Whites		35.3	64.7	17
Public Indian	25.0	50.0	25.0	4
Mission Indian	23.1	69.2	7.7	13

Figure IV-8

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Reading Vocabulary

Albuquerque Area

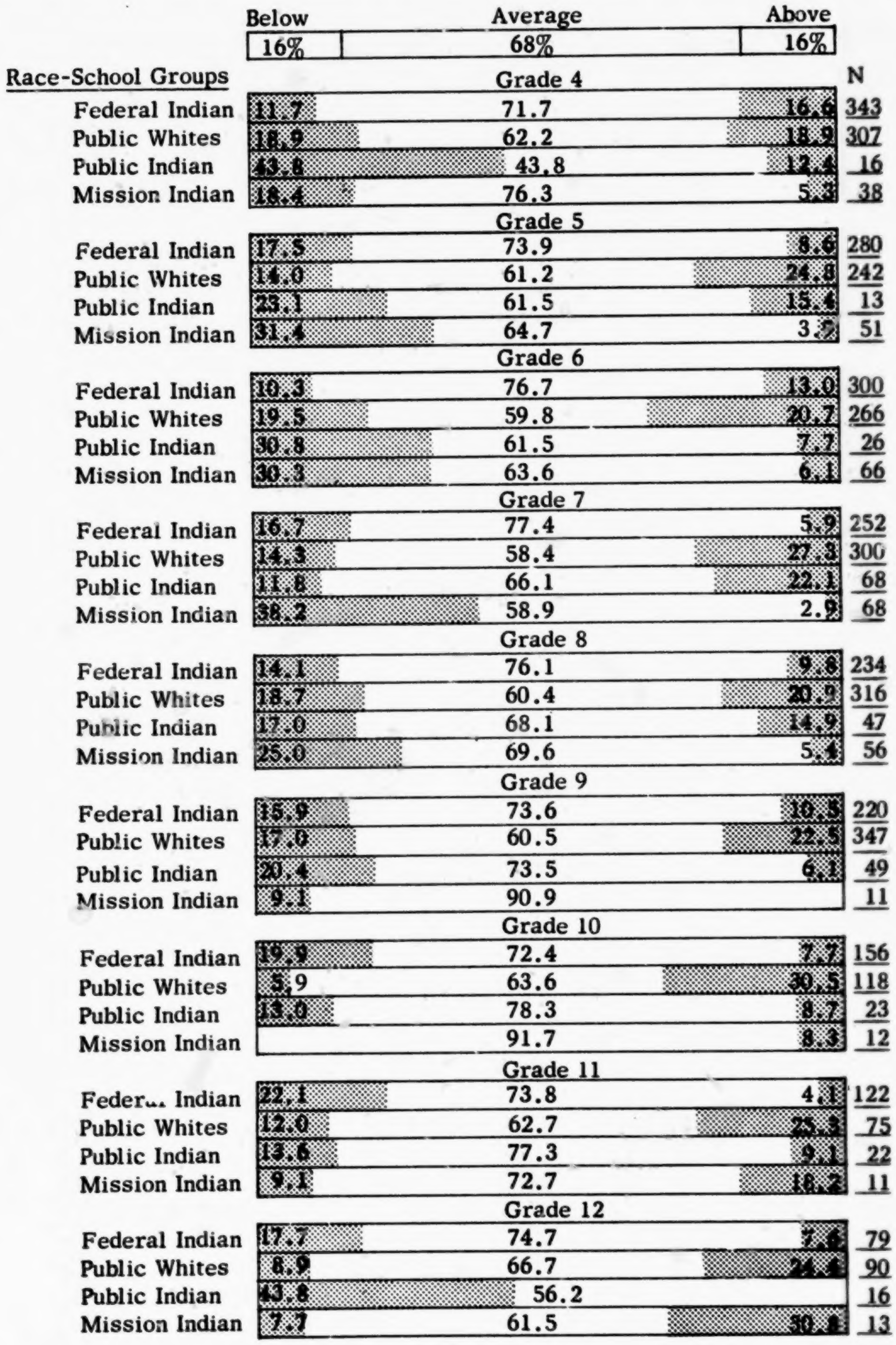


Figure IV-9

PERCENTAGES IN ACHIEVEMENT LEVELS

By Race - School Groups

Reading Comprehension

Albuquerque Area

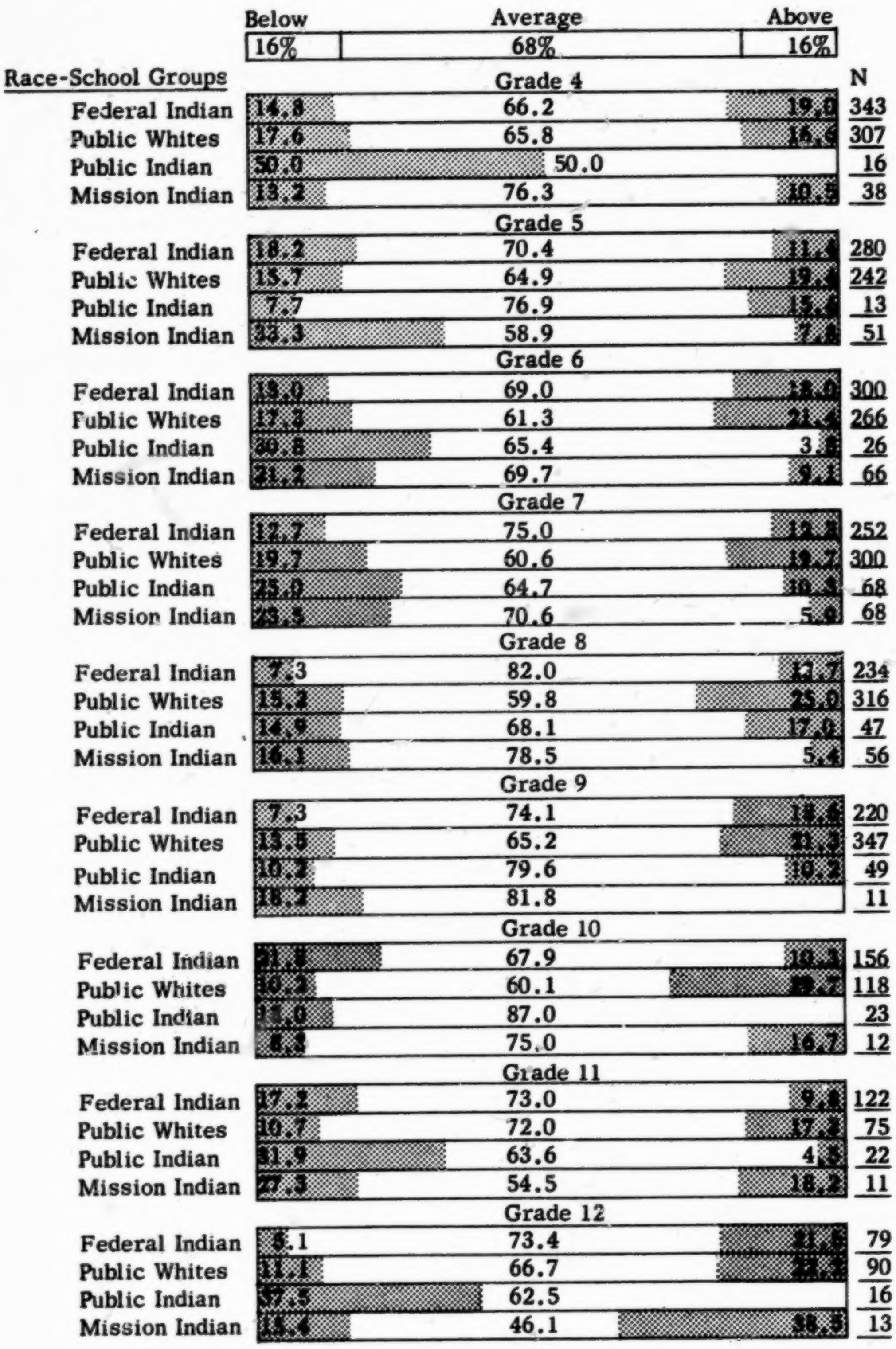


Figure IV-10

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Arithmetic Reasoning

Albuquerque Area

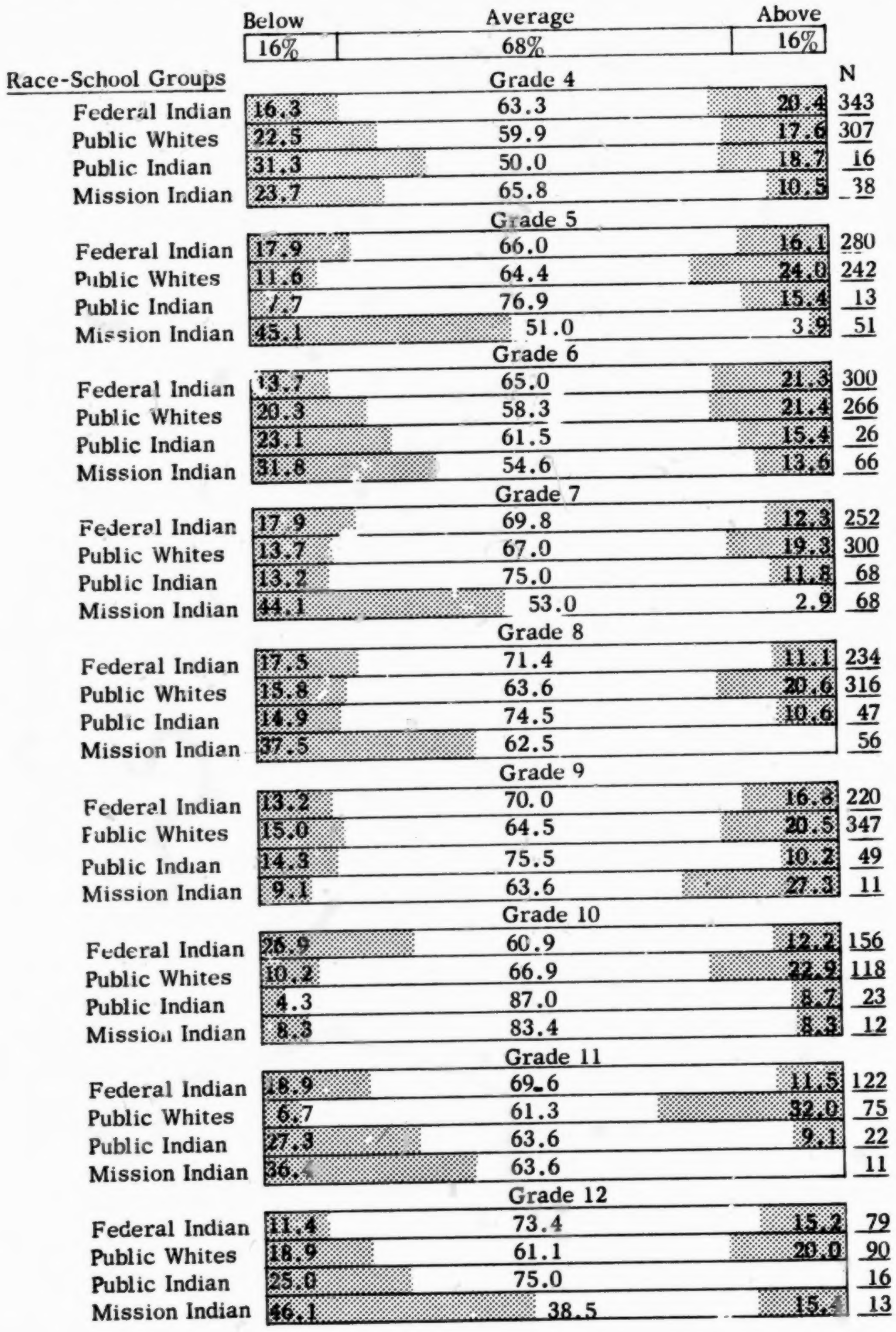


Figure IV-11

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Arithmetic Fundamentals

Albuquerque Area

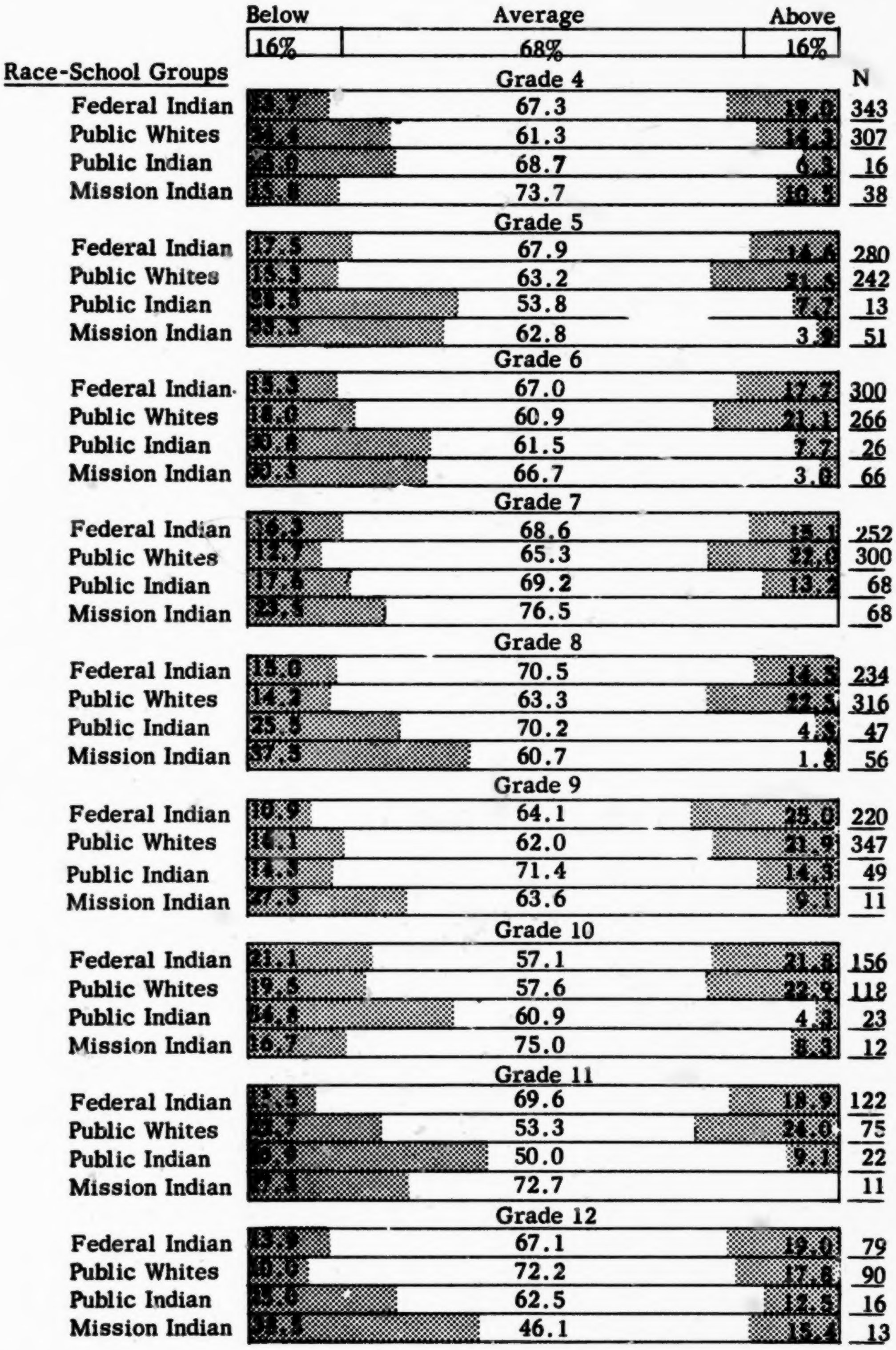


Figure IV-12

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Language

Albuquerque Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	14.0	69.7	16.3	343
Public Whites	13.0	65.8	21.2	307
Public Indian	25.0	68.7	6.3	16
Mission Indian	13.2	76.3	10.5	38
Grade 5				
Federal Indian	28.2	58.6	13.2	280
Public Whites	9.1	60.3	30.6	242
Public Indian	15.4	30.8	53.8	13
Mission Indian	27.4	66.7	5.9	51
Grade 6				
Federal Indian	18.0	62.3	19.7	300
Public Whites	17.3	61.3	21.4	266
Public Indian	15.4	69.2	15.4	26
Mission Indian	24.2	65.2	10.6	66
Grade 7				
Federal Indian	15.1	73.0	11.9	252
Public Whites	8.7	67.3	24.0	300
Public Indian	19.1	67.7	13.2	68
Mission Indian	14.7	72.1	13.2	68
Grade 8				
Federal Indian	15.8	78.6	5.6	234
Public Whites	13.3	63.3	23.4	316
Public Indian	12.8	78.7	8.5	47
Mission Indian	12.5	80.4	7.1	56
Grade 9				
Federal Indian	16.8	71.8	11.4	220
Public Whites	10.1	66.0	23.9	347
Public Indian	16.3	75.5	8.2	49
Mission Indian	9.1	81.8	9.1	11
Grade 10				
Federal Indian	34.6	57.7	7.7	156
Public Whites	11.9	57.6	30.5	118
Public Indian	17.4	73.9	8.7	23
Mission Indian	16.7	75.0	8.3	12
Grade 11				
Federal Indian	20.5	74.6	4.9	122
Public Whites	6.7	66.6	26.7	75
Public Indian	31.9	54.5	13.6	22
Mission Indian	27.3	63.6	9.1	11
Grade 12				
Federal Indian	20.3	68.3	11.4	79
Public Whites	10.0	56.7	33.3	90
Public Indian	18.8	81.2		16
Mission Indian	23.0	38.5	38.5	13

Figure IV-13

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Spelling

Albuquerque Area

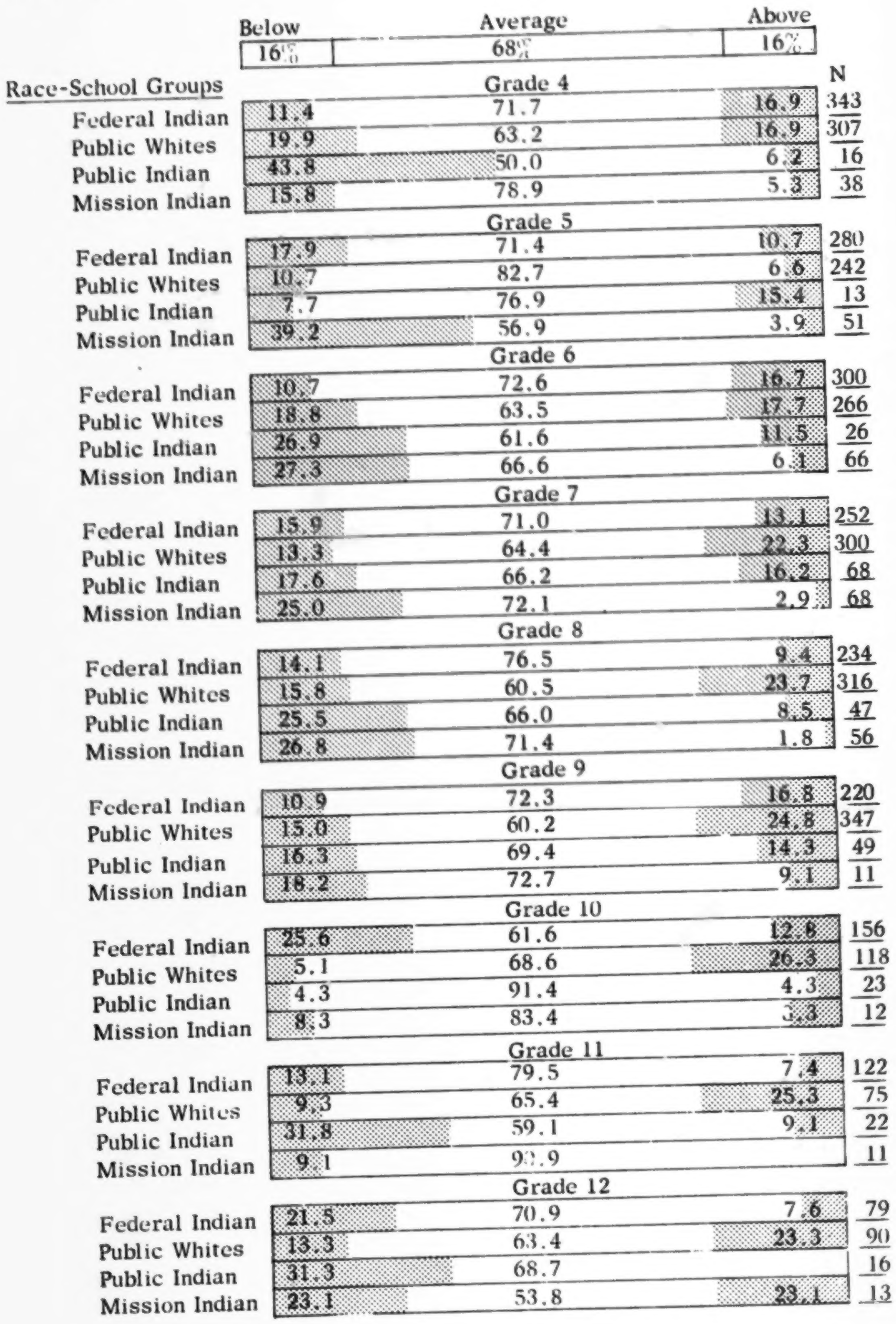
Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	13.4	65.3	21.3	343
Public Whites	19.5	66.5	14.0	307
Public Indian	6.3	87.4	6.3	16
Mission Indian	18.4	60.5	21.1	38
Grade 5				
Federal Indian	17.9	60.3	21.8	280
Public Whites	19.8	56.2	24.0	242
Public Indian	7.7	61.5	30.8	13
Mission Indian	33.3	49.0	17.7	51
Grade 6				
Federal Indian	11.3	64.0	24.7	300
Public Whites	24.4	64.7	10.9	266
Public Indian	19.2	65.4	15.4	26
Mission Indian	19.7	47.0	33.3	66
Grade 7				
Federal Indian	16.3	65.4	18.3	252
Public Whites	19.3	58.0	22.7	300
Public Indian	14.7	60.3	25.0	68
Mission Indian	23.5	55.9	20.6	68
Grade 8				
Federal Indian	11.6	57.9	30.5	234
Public Whites	19.0	53.8	27.2	316
Public Indian	12.8	55.3	31.9	47
Mission Indian	7.2	71.4	21.4	56
Grade 9				
Federal Indian	10.9	57.3	31.8	220
Public Whites	12.1	65.1	22.8	347
Public Indian	12.3	61.2	26.5	49
Mission Indian		63.6	36.4	11
Grade 10				
Federal Indian	28.9	59.6	11.5	156
Public Whites	17.8	65.3	16.9	118
Public Indian	17.4	56.5	26.1	23
Mission Indian		41.7	58.3	12
Grade 11				
Federal Indian	34.4	49.2	16.4	122
Public Whites	16.0	61.3	22.7	75
Public Indian	18.2	72.7	9.1	22
Mission Indian	18.2	45.4	36.4	11
Grade 12				
Federal Indian	22.8	62.0	15.2	79
Public Whites	17.8	65.5	16.7	90
Public Indian	25.0	75.0		16
Mission Indian	7.7	38.5	53.8	13

Figure IV-14

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Total Score

Albuquerque Area



Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	11.4	71.7	16.9	343
Public Whites	19.9	63.2	16.9	307
Public Indian	43.8	50.0	6.2	16
Mission Indian	15.8	78.9	5.3	38
Grade 5				
Federal Indian	17.9	71.4	10.7	280
Public Whites	10.7	82.7	6.6	242
Public Indian	7.7	76.9	15.4	13
Mission Indian	39.2	56.9	3.9	51
Grade 6				
Federal Indian	10.7	72.6	16.7	300
Public Whites	18.8	63.5	17.7	266
Public Indian	26.9	61.6	11.5	26
Mission Indian	27.3	66.6	6.1	66
Grade 7				
Federal Indian	15.9	71.0	13.1	252
Public Whites	13.3	64.4	22.3	300
Public Indian	17.6	66.2	16.2	68
Mission Indian	25.0	72.1	2.9	68
Grade 8				
Federal Indian	14.1	76.5	9.4	234
Public Whites	15.8	60.5	23.7	316
Public Indian	25.5	66.0	8.5	47
Mission Indian	26.8	71.4	1.8	56
Grade 9				
Federal Indian	10.9	72.3	16.8	220
Public Whites	15.0	60.2	24.8	347
Public Indian	16.3	69.4	14.3	49
Mission Indian	18.2	72.7	9.1	11
Grade 10				
Federal Indian	25.6	61.6	12.8	156
Public Whites	5.1	68.6	26.3	118
Public Indian	4.3	91.4	4.3	23
Mission Indian	8.3	83.4	8.3	12
Grade 11				
Federal Indian	13.1	79.5	7.4	122
Public Whites	9.3	65.4	25.3	75
Public Indian	31.8	59.1	9.1	22
Mission Indian	9.1	90.9		11
Grade 12				
Federal Indian	21.5	70.9	7.6	79
Public Whites	13.3	63.4	23.3	90
Public Indian	31.3	68.7		16
Mission Indian	23.1	53.8	23.1	13

Figure IV-15

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Reading Vocabulary — Aberdeen Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	19.2	70.5	10.3	505
Public Whites	8.7	54.1	37.2	298
Public Indian	12.6	69.4	18.0	111
Mission Indian	16.9	67.6	15.5	148
Grade 5				
Federal Indian	21.4	67.0	11.6	476
Public Whites	9.5	49.7	40.8	316
Public Indian	18.3	68.2	13.5	104
Mission Indian	27.7	59.5	12.8	148
Grade 6				
Federal Indian	21.1	72.4	6.5	439
Public Whites	8.9	52.9	38.2	230
Public Indian	23.8	63.8	12.4	105
Mission Indian	14.1	72.5	13.4	142
Grade 7				
Federal Indian	24.1	67.5	8.4	431
Public Whites	10.2	57.1	32.7	294
Public Indian	16.8	67.4	15.8	95
Mission Indian	16.5	67.8	15.7	127
Grade 8				
Federal Indian	21.6	66.2	12.2	417
Public Whites	14.6	58.2	27.2	268
Public Indian	17.4	58.0	24.6	69
Mission Indian	16.3	72.2	11.5	104
Grade 9				
Federal Indian	24.7	58.6	16.7	300
Public Whites	5.3	64.2	30.5	305
Public Indian	12.9	62.9	24.2	62
Mission Indian	14.6	79.1	6.3	96
Grade 10				
Federal Indian	23.1	71.0	5.9	238
Public Whites	7.6	69.1	23.3	317
Public Indian	26.4	59.8	13.8	87
Mission Indian	11.9	74.7	13.4	67
Grade 11				
Federal Indian	34.9	59.8	5.3	169
Public Whites	5.3	62.0	32.7	263
Public Indian	28.1	63.1	8.8	57
Mission Indian	11.8	74.5	13.7	51
Grade 12				
Federal Indian	26.3	67.8	5.9	152
Public Whites	11.4	63.1	25.5	255
Public Indian	23.3	62.7	14.0	43
Mission Indian	12.5	62.5	25.0	40

Figure IV-16

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Reading Comprehension

Aberdeen Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
		Grade 4		
Federal Indian	15.9	68.4	15.7	504
Public Whites	7.7	50.0	42.3	298
Public Indian	16.2	62.2	21.6	111
Mission Indian	18.9	58.8	22.3	148
		Grade 5		
Federal Indian	22.9	68.5	8.6	476
Public Whites	10.4	43.7	45.9	316
Public Indian	21.2	58.6	20.2	104
Mission Indian	28.4	52.0	19.6	148
		Grade 6		
Federal Indian	20.0	67.8	12.2	459
Public Whites	7.5	52.9	39.6	280
Public Indian	19.0	66.7	14.3	105
Mission Indian	17.6	69.0	13.4	142
		Grade 7		
Federal Indian	24.8	66.8	8.4	431
Public Whites	11.2	56.5	32.3	294
Public Indian	22.1	69.5	8.4	95
Mission Indian	12.6	71.7	15.7	127
		Grade 8		
Federal Indian	22.1	69.3	8.6	417
Public Whites	11.6	51.5	36.9	268
Public Indian	14.5	66.7	18.8	68
Mission Indian	22.1	66.4	11.5	104
		Grade 9		
Federal Indian	24.0	67.3	8.7	300
Public Whites	7.5	52.5	40.0	305
Public Indian	22.6	58.0	19.4	62
Mission Indian	28.1	55.2	16.7	96
		Grade 10		
Federal Indian	24.8	69.3	5.9	238
Public Whites	8.2	59.9	31.9	317
Public Indian	25.3	63.2	11.5	87
Mission Indian	20.9	61.2	17.9	67
		Grade 11		
Federal Indian	22.5	68.6	8.9	169
Public Whites	9.1	63.5	27.4	263
Public Indian	22.8	64.9	12.3	57
Mission Indian	9.8	72.6	17.6	51
		Grade 12		
Federal Indian	23.0	68.4	8.6	152
Public Whites	12.2	63.1	24.7	255
Public Indian	23.3	72.0	4.7	43
Mission Indian	12.5	67.5	20.0	40

Figure IV-17

PERCENTAGES IN ACHIEVEMENT LEVELS

By Race - School Groups

Arithmetic Reasoning | Aberdeen Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	23.8	61.9	14.3	504
Public Whites	11.1	56.3	32.6	298
Public Indian	13.5	64.9	21.6	111
Mission Indian	20.9	62.9	16.2	148
Grade 5				
Federal Indian	20.6	67.0	12.4	476
Public Whites	9.2	53.2	37.6	316
Public Indian	20.2	59.6	20.2	104
Mission Indian	20.3	61.5	18.2	148
Grade 6				
Federal Indian	20.3	64.7	15.0	459
Public Whites	8.9	49.6	41.5	280
Public Indian	22.9	61.9	15.2	105
Mission Indian	18.3	69.7	12.0	142
Grade 7				
Federal Indian	24.1	64.3	11.6	431
Public Whites	11.2	55.1	33.7	294
Public Indian	17.9	67.4	14.7	95
Mission Indian	14.2	70.1	15.7	127
Grade 8				
Federal Indian	23.5	67.6	8.9	417
Public Whites	6.7	63.4	29.9	268
Public Indian	20.3	68.1	11.6	69
Mission Indian	21.2	57.6	21.2	104
Grade 9				
Federal Indian	31.0	63.0	6.0	300
Public Whites	4.6	58.7	36.7	305
Public Indian	14.5	71.0	14.5	62
Mission Indian	19.8	63.5	16.7	96
Grade 10				
Federal Indian	37.4	59.2	3.4	238
Public Whites	7.9	62.1	30.0	317
Public Indian	32.2	57.5	10.3	87
Mission Indian	16.4	73.1	10.5	67
Grade 11				
Federal Indian	37.9	56.8	5.3	169
Public Whites	9.5	62.7	27.8	263
Public Indian	36.8	63.2		57
Mission Indian	27.5	64.7	7.8	51
Grade 12				
Federal Indian	26.3	71.1	2.6	152
Public Whites	11.8	63.1	25.1	255
Public Indian	27.9	60.5	11.6	43
Mission Indian	25.0	47.5	27.5	40

Figure IV-18

PERCENTAGES IN ACHIEVEMENT LEVELS

By Race - School Groups

Arithmetic Fundamentals — **Aberdeen Area**

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	16.3	63.1	20.6	504
Public Whites	10.0	64.5	25.5	298
Public Indian	18.0	63.1	18.9	111
Mission Indian	34.5	58.1	7.4	148
Grade 5				
Federal Indian	16.2	70.4	13.4	476
Public Whites	6.3	58.5	35.2	316
Public Indian	19.2	64.4	16.4	104
Mission Indian	25.7	59.5	14.8	148
Grade 6				
Federal Indian	22.7	64.4	12.9	459
Public Whites	8.6	50.0	41.4	280
Public Indian	20.0	61.0	19.0	105
Mission Indian	13.4	74.6	12.0	142
Grade 7				
Federal Indian	27.8	62.5	9.7	431
Public Whites	7.5	55.1	37.4	294
Public Indian	21.1	66.3	12.6	95
Mission Indian	17.3	68.5	14.2	127
Grade 8				
Federal Indian	22.3	68.6	9.1	417
Public Whites	7.1	57.5	35.4	268
Public Indian	18.8	66.7	14.5	69
Mission Indian	19.2	62.5	18.3	104
Grade 9				
Federal Indian	26.0	62.7	11.3	300
Public Whites	6.9	58.3	34.8	305
Public Indian	25.8	59.7	14.5	62
Mission Indian	28.1	53.1	18.8	96
Grade 10				
Federal Indian	26.1	63.0	10.9	238
Public Whites	8.2	66.2	25.6	317
Public Indian	36.8	55.2	8.0	87
Mission Indian	25.4	56.7	17.9	67
Grade 11				
Federal Indian	26.6	60.4	13.0	169
Public Whites	6.9	66.5	26.6	263
Public Indian	29.8	68.4	1.8	57
Mission Indian	23.5	60.8	15.7	51
Grade 12				
Federal Indian	28.3	61.2	10.5	152
Public Whites	10.2	63.9	25.9	255
Public Indian	32.6	58.1	9.3	43
Mission Indian	20.0	55.0	25.0	40

Figure IV-19

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Language | Aberdeen Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	24.2	66.7	9.1	504
Public Whites	7.7	53.4	38.9	298
Public Indian	9.9	63.1	27.0	111
Mission Indian	12.9	60.1	27.0	148
Grade 5				
Federal Indian	24.8	70.0	5.2	476
Public Whites	6.6	57.9	35.5	316
Public Indian	20.2	69.2	10.6	104
Mission Indian	6.8	70.9	22.3	148
Grade 6				
Federal Indian	29.0	62.1	8.9	459
Public Whites	8.6	52.5	38.9	280
Public Indian	15.2	69.6	15.2	105
Mission Indian	15.5	69.7	14.8	142
Grade 7				
Federal Indian	27.2	65.2	7.6	431
Public Whites	10.9	49.6	39.5	294
Public Indian	15.8	69.5	14.7	95
Mission Indian	15.0	73.2	11.8	127
Grade 8				
Federal Indian	25.2	67.8	7.0	417
Public Whites	8.2	56.0	35.8	268
Public Indian	11.6	68.1	20.3	69
Mission Indian	11.5	63.5	25.0	104
Grade 9				
Federal Indian	26.7	68.3	5.0	300
Public Whites	5.6	63.6	30.8	305
Public Indian	16.1	74.2	9.7	62
Mission Indian	21.9	63.5	14.6	96
Grade 10				
Federal Indian	23.5	68.9	7.6	238
Public Whites	7.3	63.7	29.0	317
Public Indian	26.4	65.5	8.1	87
Mission Indian	9.0	71.6	19.4	67
Grade 11				
Federal Indian	20.7	64.5	14.8	169
Public Whites	11.0	64.3	24.7	263
Public Indian	15.8	59.6	24.6	57
Mission Indian	23.5	64.7	11.8	51
Grade 12				
Federal Indian	21.1	60.5	18.4	152
Public Whites	20.0	59.2	20.8	255
Public Indian	16.3	65.1	18.6	43
Mission Indian	7.5	65.0	27.5	40

Figure IV-20

PERCENTAGES IN ACHIEVEMENT LEVELS

By Race - School Groups

Spelling

Aberdeen Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	39.7	52.2	8.1	504
Public Whites	24.8	58.4	16.8	298
Public Indian	30.6	56.8	12.6	111
Mission Indian	41.9	52.0	6.1	148
Grade 5				
Federal Indian	27.9	57.6	14.5	476
Public Whites	13.0	59.2	27.8	316
Public Indian	21.2	57.6	21.2	104
Mission Indian	20.9	58.8	20.3	148
Grade 6				
Federal Indian	25.1	55.7	19.2	459
Public Whites	14.3	57.1	28.6	280
Public Indian	16.2	55.2	28.6	105
Mission Indian	14.1	57.0	28.9	142
Grade 7				
Federal Indian	25.8	55.4	18.8	431
Public Whites	20.7	57.5	21.8	294
Public Indian	15.8	56.8	27.4	95
Mission Indian	15.0	63.0	22.0	127
Grade 8				
Federal Indian	22.5	62.1	15.4	417
Public Whites	4.9	78.7	16.4	268
Public Indian	24.6	46.4	29.0	69
Mission Indian	10.6	69.2	20.2	104
Grade 9				
Federal Indian	24.3	52.7	23.0	300
Public Whites	14.1	61.0	24.9	305
Public Indian	11.3	61.3	27.4	62
Mission Indian	25.0	56.2	18.8	96
Grade 10				
Federal Indian	23.5	63.9	12.6	238
Public Whites	18.9	60.6	20.5	317
Public Indian	19.5	64.4	16.1	87
Mission Indian	19.4	59.7	20.9	67
Grade 11				
Federal Indian	20.7	64.5	14.8	169
Public Whites	11.0	64.3	24.7	263
Public Indian	15.8	59.6	24.6	57
Mission Indian	23.5	64.7	11.8	51
Grade 12				
Federal Indian	21.1	60.5	18.4	152
Public Whites	20.0	59.2	20.8	255
Public Indian	16.3	65.1	18.6	43
Mission Indian	7.5	65.0	27.5	40

Figure IV-21

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

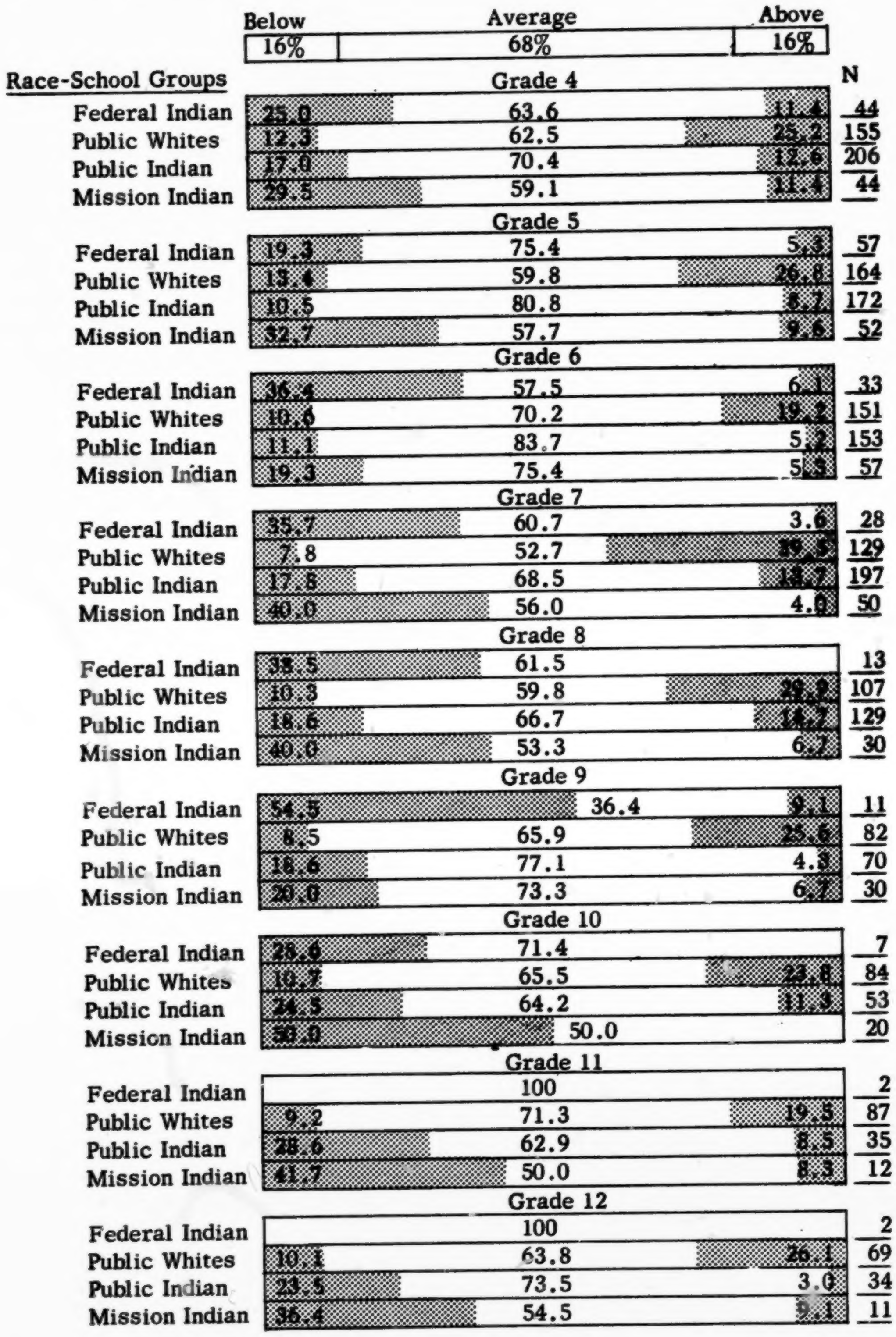
Total Score

Aberdeen Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	19.4	69.7	10.9	504
Public Whites	8.4	54.4	37.2	298
Public Indian	13.5	69.4	17.1	111
Mission Indian	19.6	68.2	12.2	148
Grade 5				
Federal Indian	22.7	69.7	7.6	476
Public Whites	7.6	52.5	39.9	316
Public Indian	15.4	70.2	14.4	104
Mission Indian	19.6	69.6	10.8	148
Grade 6				
Federal Indian	21.8	70.1	8.1	459
Public Whites	7.5	53.3	39.2	280
Public Indian	19.1	65.7	15.2	105
Mission Indian	8.5	83.0	8.5	142
Grade 7				
Federal Indian	26.2	64.7	9.1	431
Public Whites	9.9	54.0	36.1	294
Public Indian	15.8	67.4	16.8	95
Mission Indian	16.5	69.3	14.2	127
Grade 8				
Federal Indian	21.8	71.8	7.2	417
Public Whites	9.3	58.2	32.5	268
Public Indian	15.9	68.2	15.9	69
Mission Indian	12.5	72.1	15.4	104
Grade 9				
Federal Indian	23.7	68.3	8.0	300
Public Whites	4.6	60.6	34.8	305
Public Indian	16.1	71.0	12.9	62
Mission Indian	17.7	69.8	12.5	96
Grade 10				
Federal Indian	24.4	70.1	5.5	238
Public Whites	4.7	66.9	28.4	317
Public Indian	28.7	59.8	11.5	87
Mission Indian	16.4	68.7	14.9	67
Grade 11				
Federal Indian	28.4	66.9	4.7	169
Public Whites	4.6	66.9	28.5	263
Public Indian	24.6	71.9	3.5	57
Mission Indian	11.8	82.3	5.9	51
Grade 12				
Federal Indian	25.0	70.4	4.6	152
Public Whites	9.8	66.7	23.5	255
Public Indian	27.9	55.8	16.3	43
Mission Indian	12.5	65.0	22.5	40

Figure IV-22

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups



Race-School Groups	Below	Average	Above	N
Grade 4				
Federal Indian	25.0	63.6	11.4	44
Public Whites	12.3	62.5	25.2	155
Public Indian	17.0	70.4	12.6	206
Mission Indian	29.5	59.1	11.4	44
Grade 5				
Federal Indian	19.3	75.4	5.3	57
Public Whites	13.4	59.8	26.8	164
Public Indian	10.5	80.8	8.7	172
Mission Indian	32.7	57.7	9.6	52
Grade 6				
Federal Indian	36.4	57.5	6.1	33
Public Whites	10.6	70.2	19.2	151
Public Indian	11.1	83.7	5.2	153
Mission Indian	19.3	75.4	5.3	57
Grade 7				
Federal Indian	35.7	60.7	3.6	28
Public Whites	7.8	52.7	39.5	129
Public Indian	17.8	68.5	13.7	197
Mission Indian	40.0	56.0	4.0	50
Grade 8				
Federal Indian	38.5	61.5		13
Public Whites	10.3	59.8	29.9	107
Public Indian	18.6	66.7	14.7	129
Mission Indian	40.0	53.3	6.7	30
Grade 9				
Federal Indian	54.5	36.4	9.1	11
Public Whites	8.5	65.9	25.6	82
Public Indian	18.6	77.1	4.3	70
Mission Indian	20.0	73.3	6.7	30
Grade 10				
Federal Indian	28.6	71.4		7
Public Whites	10.7	65.5	23.8	84
Public Indian	24.5	64.2	11.3	53
Mission Indian	50.0	50.0		20
Grade 11				
Federal Indian		100		2
Public Whites	9.2	71.3	19.5	87
Public Indian	28.6	62.9	8.5	35
Mission Indian	41.7	50.0	8.3	12
Grade 12				
Federal Indian		100		2
Public Whites	10.1	63.8	26.1	69
Public Indian	23.5	73.5	3.0	34
Mission Indian	36.4	54.5	9.1	11

Figure IV-23

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Reading Comprehension

Billings Area

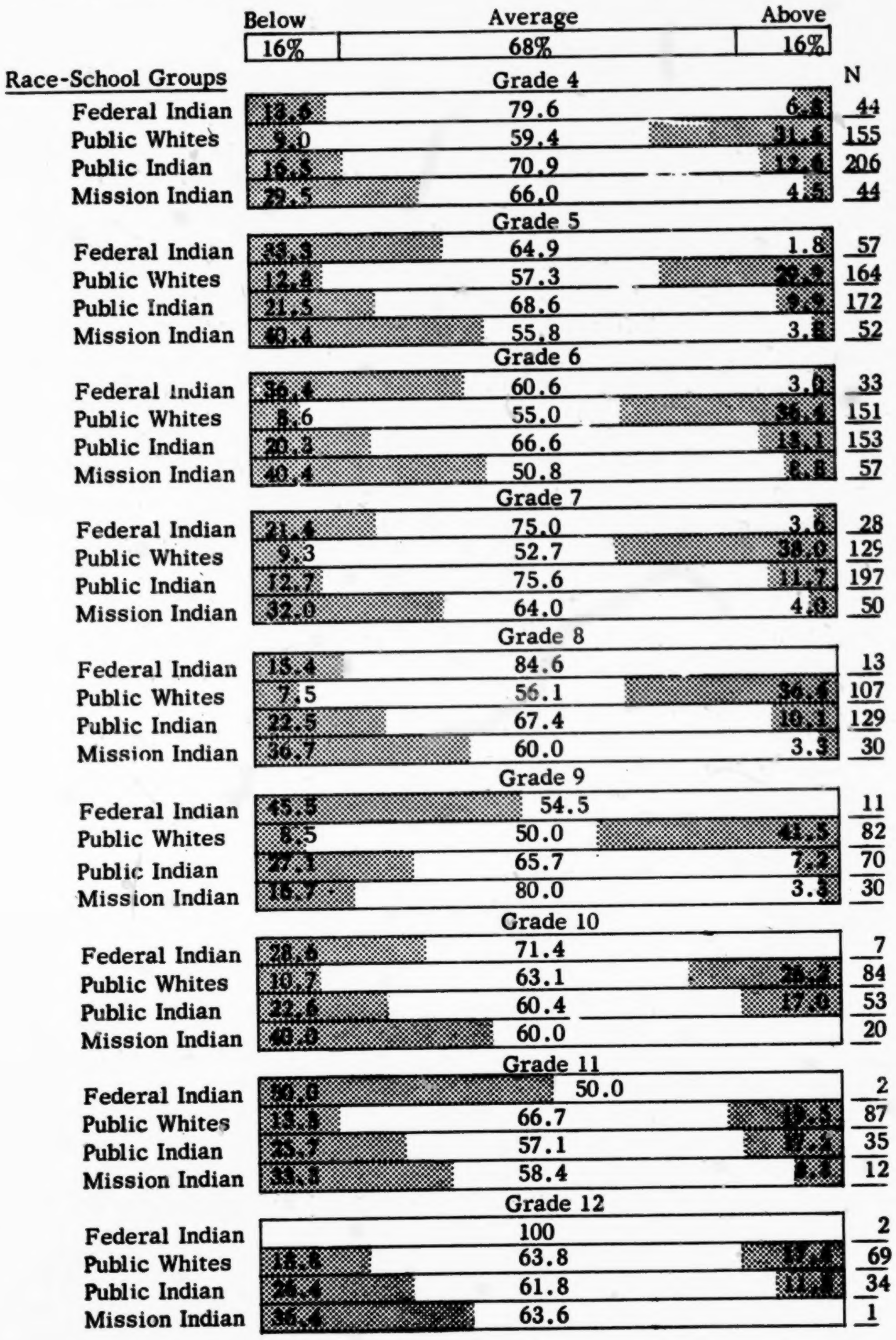
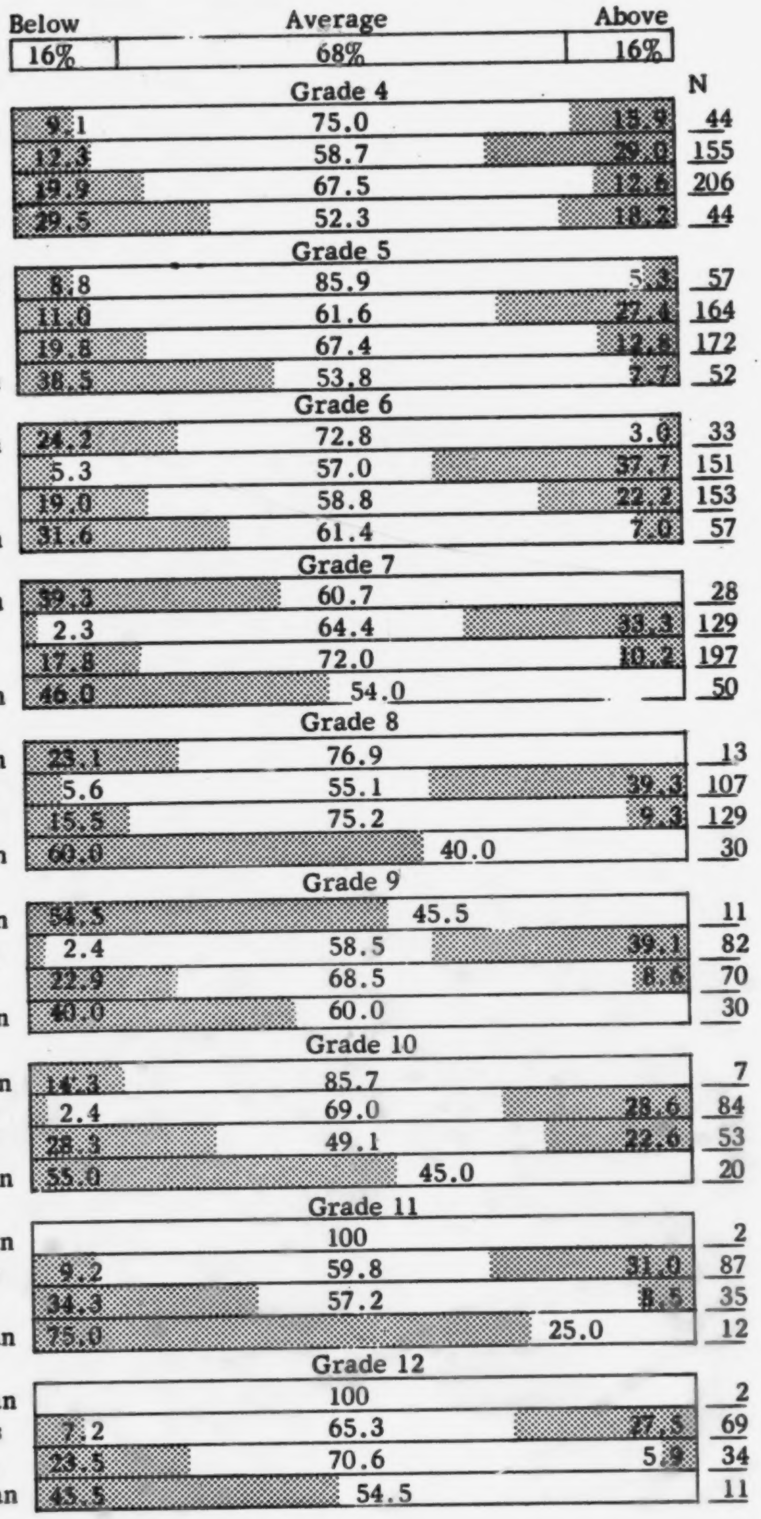


Figure IV-24

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Arithmetic Reasoning

Billings Area



Race-School Groups	Below	Average	Above	N
Grade 4				
Federal Indian	9.1	75.0	15.9	44
Public Whites	12.3	58.7	29.0	155
Public Indian	19.9	67.5	12.6	206
Mission Indian	29.5	52.3	18.2	44
Grade 5				
Federal Indian	8.8	85.9	5.3	57
Public Whites	11.0	61.6	27.4	164
Public Indian	19.8	67.4	12.8	172
Mission Indian	38.5	53.8	7.7	52
Grade 6				
Federal Indian	24.2	72.8	3.0	33
Public Whites	5.3	57.0	37.7	151
Public Indian	19.0	58.8	22.2	153
Mission Indian	31.6	61.4	7.0	57
Grade 7				
Federal Indian	39.3	60.7		28
Public Whites	2.3	64.4	33.3	129
Public Indian	17.8	72.0	10.2	197
Mission Indian	46.0	54.0		50
Grade 8				
Federal Indian	23.1	76.9		13
Public Whites	5.6	55.1	39.3	107
Public Indian	15.5	75.2	9.3	129
Mission Indian	60.0	40.0		30
Grade 9				
Federal Indian	54.5	45.5		11
Public Whites	2.4	58.5	39.1	82
Public Indian	22.9	68.5	8.6	70
Mission Indian	40.0	60.0		30
Grade 10				
Federal Indian	14.3	85.7		7
Public Whites	2.4	69.0	28.6	84
Public Indian	28.3	49.1	22.6	53
Mission Indian	55.0	45.0		20
Grade 11				
Federal Indian		100		2
Public Whites	9.2	59.8	31.0	87
Public Indian	34.3	57.2	8.5	35
Mission Indian	75.0	25.0		12
Grade 12				
Federal Indian		100		2
Public Whites	7.2	65.3	27.5	69
Public Indian	23.5	70.6	5.9	34
Mission Indian	45.5	54.5		11

Figure IV-25

PERCENTAGES IN ACHIEVEMENT LEVELS

By Race - School Groups

Arithmetic Fundamentals

Billings Area

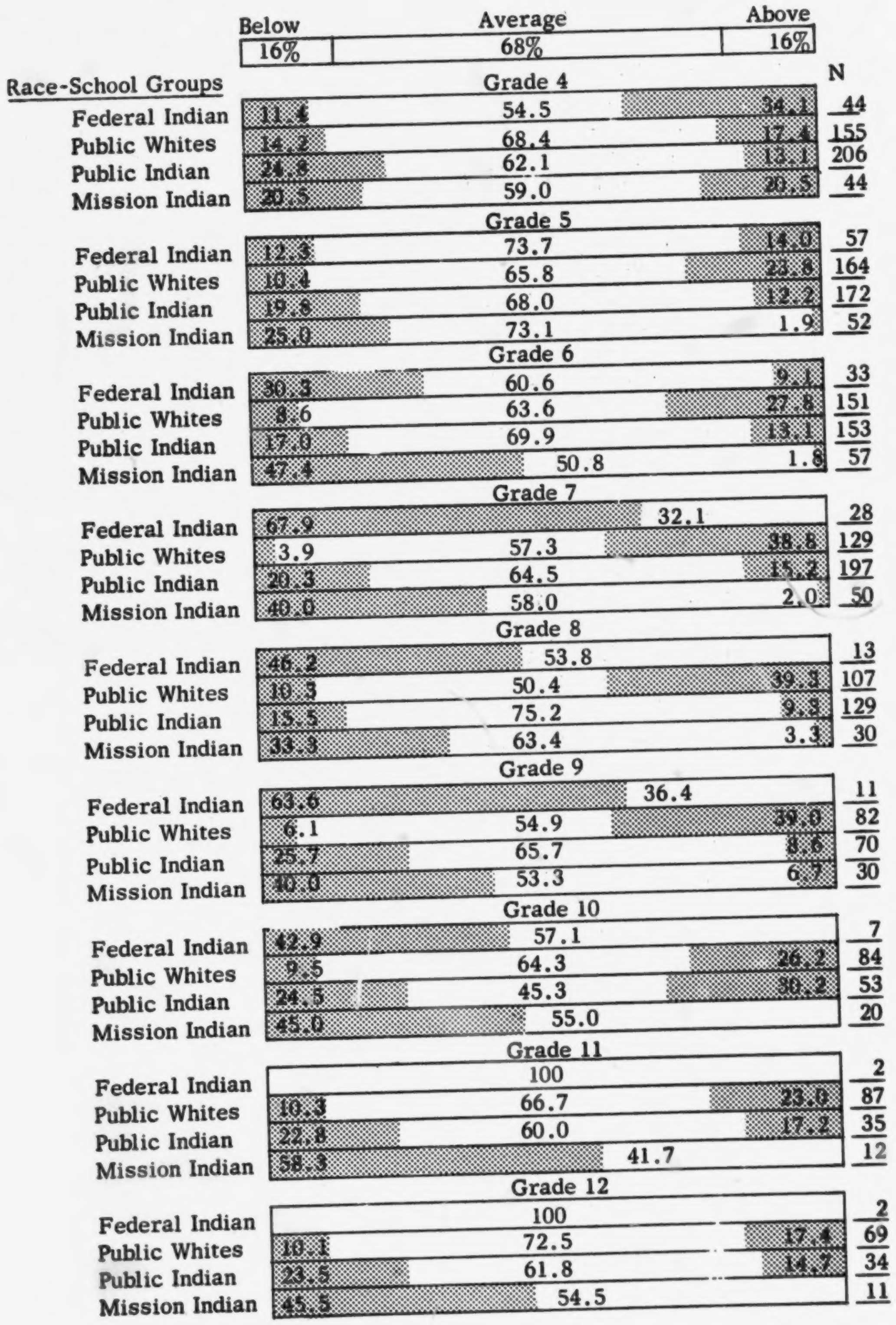


Figure IV-26

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Language

Billings Area

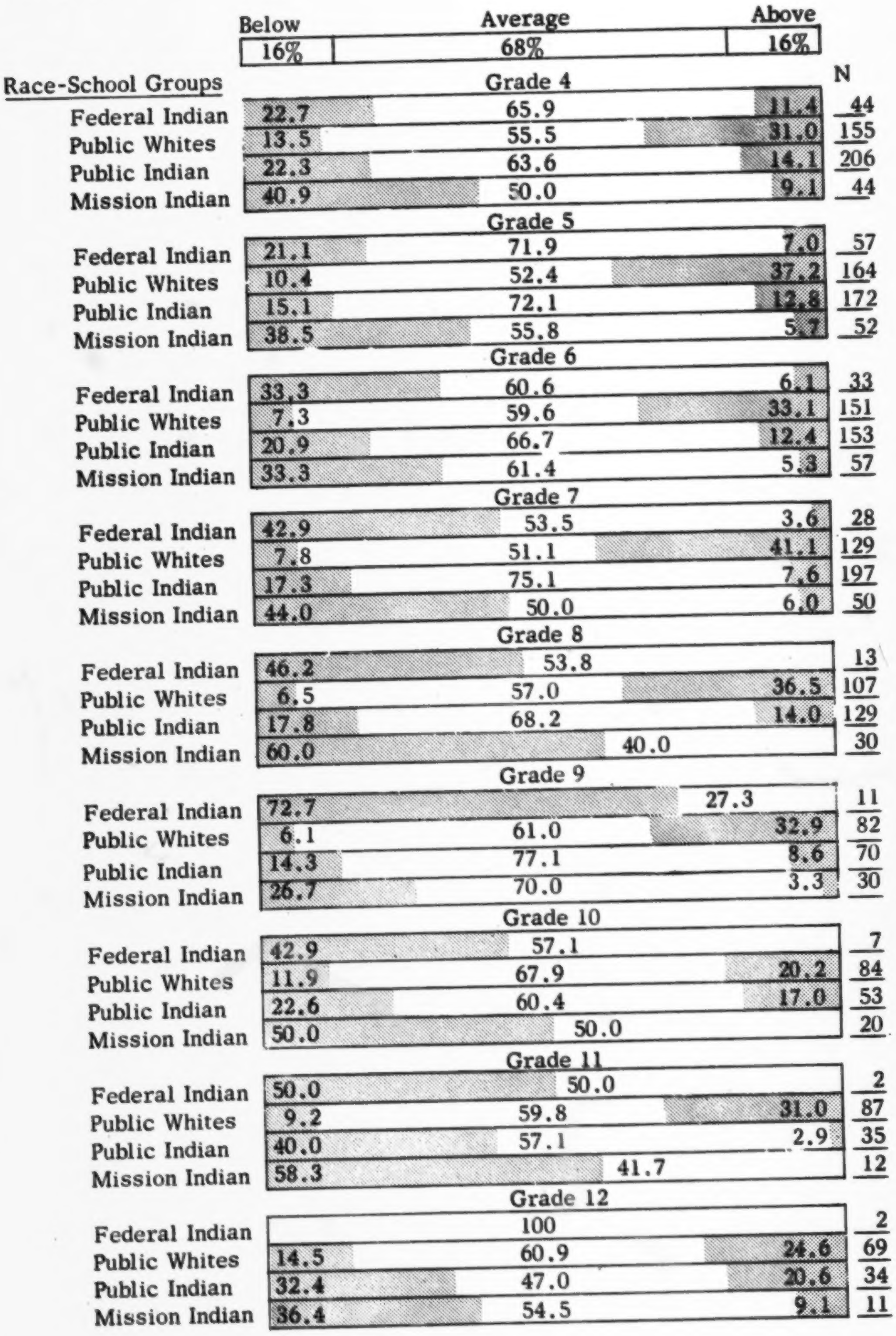


Figure IV-27

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Spelling

Billings Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	15.9	75.0	9.1	44
Public Whites	15.5	58.7	25.8	155
Public Indian	17.0	66.0	17.0	206
Mission Indian	20.5	65.9	13.6	44
Grade 5				
Federal Indian	22.8	61.4	15.8	57
Public Whites	15.9	56.7	27.4	164
Public Indian	19.2	59.9	20.9	172
Mission Indian	34.6	53.9	11.5	52
Grade 6				
Federal Indian	42.4	48.5	9.1	33
Public Whites	12.6	60.3	27.1	151
Public Indian	21.6	60.1	18.3	153
Mission Indian	22.8	61.4	15.8	57
Grade 7				
Federal Indian	35.7	50.0	14.3	28
Public Whites	14.0	59.6	26.4	129
Public Indian	22.8	58.4	18.8	197
Mission Indian	32.0	52.0	16.0	50
Grade 8				
Federal Indian	38.5	38.5	23.0	13
Public Whites	17.8	60.7	21.5	107
Public Indian	18.6	63.6	17.8	129
Mission Indian	36.7	50.0	13.3	30
Grade 9				
Federal Indian	63.6	27.3	9.1	11
Public Whites	20.7	54.9	24.4	82
Public Indian	21.4	65.7	12.9	70
Mission Indian	13.3	60.0	26.7	30
Grade 10				
Federal Indian		71.4	28.6	7
Public Whites	22.6	59.5	17.9	84
Public Indian	17.0	64.1	18.9	53
Mission Indian	20.0	65.0	15.0	20
Grade 11				
Federal Indian	50.0	50.0		2
Public Whites	16.1	63.2	20.7	87
Public Indian	20.0	65.7	14.3	35
Mission Indian	16.7	66.6	16.7	12
Grade 12				
Federal Indian		50.0	50.0	2
Public Whites	14.5	65.3	20.2	69
Public Indian	32.4	50.0	17.6	34
Mission Indian	9.1	81.8	9.1	11

Figure IV-28

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Total Score

Billings Area

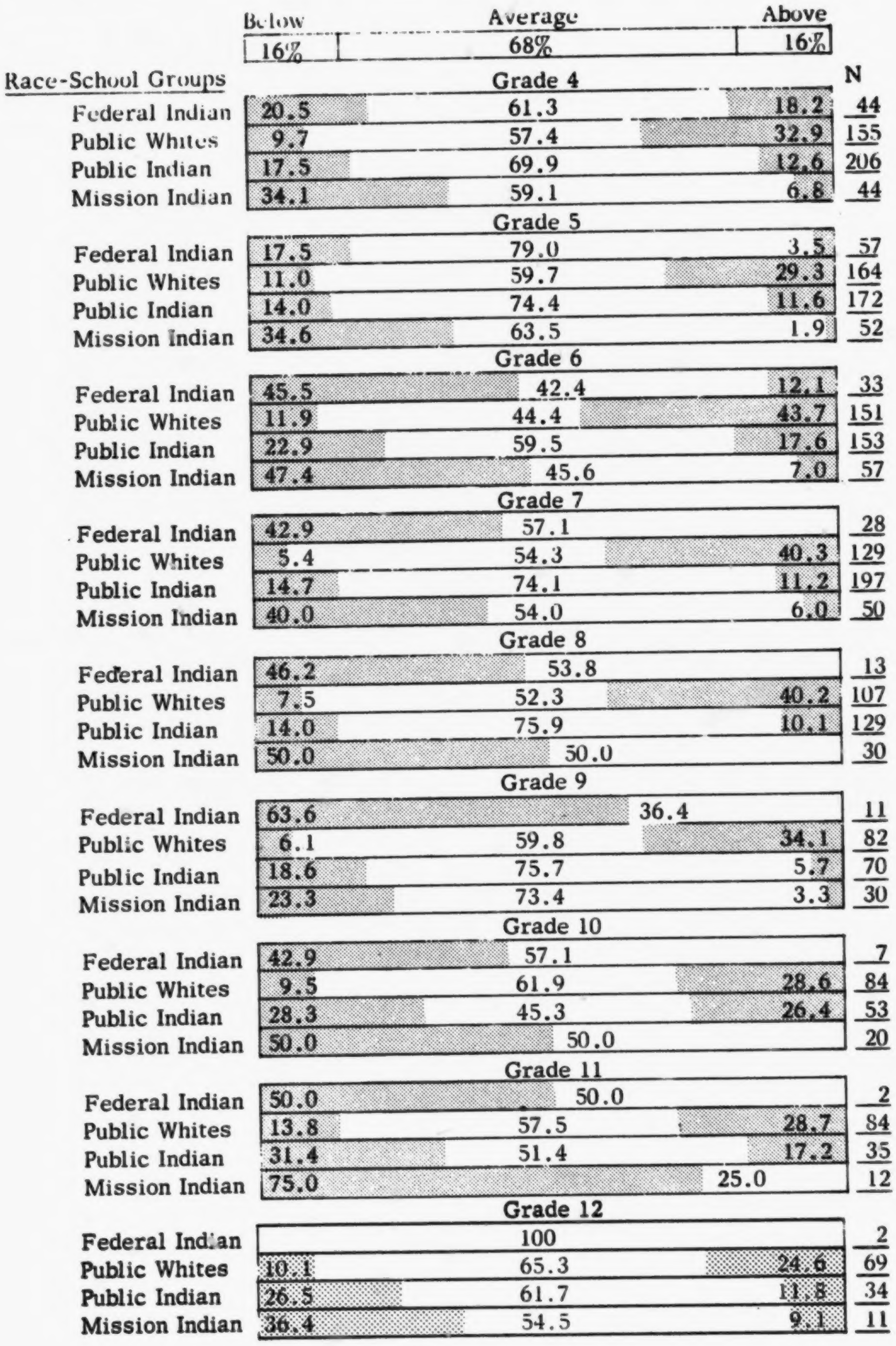


Figure IV-29

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Reading Vocabulary

Anadarko Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	39.6	56.6	3.8	53
Public Whites	5.6	71.2	23.2	125
Public Indian	6.5	70.9	22.6	31
Mission Indian				—
Grade 5				
Federal Indian	27.9	72.1		61
Public Whites	11.2	66.4	22.4	143
Public Indian	12.8	82.1	5.1	39
Mission Indian				—
Grade 6				
Federal Indian	23.6	70.9	5.5	55
Public Whites	8.8	73.7	17.5	114
Public Indian	20.8	66.7	12.5	24
Mission Indian				—
Grade 7				
Federal Indian	23.2	72.2	4.6	108
Public Whites	8.2	65.4	26.4	110
Public Indian	25.7	62.9	11.4	35
Mission Indian				—
Grade 8				
Federal Indian	24.8	68.2	7.0	129
Public Whites	10.3	66.1	23.6	165
Public Indian	15.2	78.7	6.1	33
Mission Indian				—
Grade 9				
Federal Indian	19.0	74.9	6.1	231
Public Whites	9.8	63.4	26.8	164
Public Indian	8.1	73.0	18.9	37
Mission Indian				—
Grade 10				
Federal Indian	19.6	68.1	12.3	317
Public Whites	3.3	71.2	25.5	153
Public Indian	10.0	70.0	20.0	20
Mission Indian				—
Grade 11				
Federal Indian	22.3	60.9	16.8	256
Public Whites	10.1	72.2	17.7	158
Public Indian	24.0	68.0	8.0	25
Mission Indian				—
Grade 12				
Federal Indian	18.4	69.7	11.9	218
Public Whites	6.5	67.5	26.0	123
Public Indian		87.5	12.5	16
Mission Indian				—

Figure IV-30

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Reading Comprehension

Anadarko Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	32.1	56.6	11.3	53
Public Whites	17.6	59.2	23.2	125
Public Indian	6.5	74.2	19.3	31
Mission Indian				—
Grade 5				
Federal Indian	21.3	73.8	4.9	61
Public Whites	14.7	65.7	19.6	143
Public Indian	20.5	76.9	2.6	39
Mission Indian				—
Grade 6				
Federal Indian	30.9	56.4	12.7	55
Public Whites	14.9	63.2	21.9	114
Public Indian	16.7	75.0	8.3	24
Mission Indian				—
Grade 7				
Federal Indian	25.0	67.6	7.4	108
Public Whites	11.8	59.1	29.1	110
Public Indian	17.1	74.3	8.6	35
Mission Indian				—
Grade 8				
Federal Indian	17.8	72.9	9.3	129
Public Whites	17.6	55.7	26.7	165
Public Indian	18.2	69.7	12.1	33
Mission Indian				—
Grade 9				
Federal Indian	20.3	70.6	9.1	231
Public Whites	15.9	56.7	27.4	164
Public Indian	5.4	91.9	2.7	37
Mission Indian				—
Grade 10				
Federal Indian	18.3	66.9	14.8	317
Public Whites	8.5	62.1	29.4	153
Public Indian	5.0	85.0	10.0	20
Mission Indian				—
Grade 11				
Federal Indian	18.8	66.0	15.2	256
Public Whites	15.2	61.4	23.4	158
Public Indian	20.0	60.0	20.0	25
Mission Indian				—
Grade 12				
Federal Indian	17.9	67.0	15.1	218
Public Whites	15.4	57.8	26.8	123
Public Indian		87.5	12.5	16
Mission Indian				—

Figure IV-31

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Arithmetic Reasoning

Anadarko Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
		Grade 4		
Federal Indian	37.7	52.8	9.5	53
Public Whites	14.4	67.2	18.4	125
Public Indian	12.9	67.7	19.4	31
Mission Indian				
		Grade 5		
Federal Indian	27.9	62.3	9.8	61
Public Whites	13.3	67.1	19.6	143
Public Indian	12.8	79.5	7.7	39
Mission Indian				
		Grade 6		
Federal Indian	34.5	56.4	9.1	55
Public Whites	7.0	66.7	26.3	114
Public Indian	20.8	62.5	16.7	24
Mission Indian				
		Grade 7		
Federal Indian	27.8	65.7	6.5	108
Public Whites	6.4	67.2	26.4	110
Public Indian	14.3	77.1	8.6	35
Mission Indian				
		Grade 8		
Federal Indian	24.0	67.5	8.5	129
Public Whites	10.3	61.8	27.9	165
Public Indian	12.1	78.8	9.1	33
Mission Indian				
		Grade 9		
Federal Indian	24.2	69.7	6.1	231
Public Whites	8.5	59.2	32.3	164
Public Indian	8.1	73.0	18.9	37
Mission Indian				
		Grade 10		
Federal Indian	21.5	69.7	8.8	317
Public Whites	4.6	59.5	35.9	153
Public Indian	10.0	70.0	20.0	20
Mission Indian				
		Grade 11		
Federal Indian	28.5	60.2	11.3	256
Public Whites	8.9	61.4	29.7	158
Public Indian	16.0	64.0	20.0	25
Mission Indian				
		Grade 12		
Federal Indian	25.2	65.6	9.2	218
Public Whites	6.5	56.1	37.4	123
Public Indian	18.8	62.4	18.8	16
Mission Indian				

Figure IV-32

PERCENTAGES IN ACHIEVEMENT LEVELS

By Race - School Groups

Arithmetic Fundamentals

Anadarko Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
		Grade 4		
Federal Indian	15.1	64.1	20.8	53
Public Whites	12.0	72.8	15.2	125
Public Indian	12.9	77.4	9.7	31
Mission Indian				—
		Grade 5		
Federal Indian	18.0	70.5	11.5	61
Public Whites	16.8	67.1	16.1	143
Public Indian	25.6	61.6	12.8	39
Mission Indian				—
		Grade 6		
Federal Indian	27.3	58.2	14.5	55
Public Whites	9.6	70.2	20.2	114
Public Indian	25.0	70.8	4.2	24
Mission Indian				—
		Grade 7		
Federal Indian	32.4	58.3	9.3	108
Public Whites	17.3	56.3	26.4	110
Public Indian	20.0	71.4	8.6	35
Mission Indian				—
		Grade 8		
Federal Indian	20.9	70.6	8.5	129
Public Whites	9.7	60.0	30.3	165
Public Indian	24.2	66.7	9.1	33
Mission Indian				—
		Grade 9		
Federal Indian	21.2	71.9	6.9	231
Public Whites	14.0	53.7	32.3	164
Public Indian	18.9	56.8	24.3	37
Mission Indian				—
		Grade 10		
Federal Indian	24.0	65.6	10.4	317
Public Whites	9.8	61.4	28.8	153
Public Indian	5.0	80.0	15.0	20
Mission Indian				—
		Grade 11		
Federal Indian	24.2	62.1	13.7	256
Public Whites	12.7	50.6	36.7	158
Public Indian	28.0	52.0	20.0	25
Mission Indian				—
		Grade 12		
Federal Indian	21.6	66.0	12.4	218
Public Whites	15.4	56.1	28.5	123
Public Indian	6.3	75.0	18.7	16
Mission Indian				—

Figure IV-33

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Language | Anadarko Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	39.6	52.8	7.6	53
Public Whites	12.8	68.8	18.4	125
Public Indian	12.9	80.6	6.5	31
Mission Indian				
Grade 5				
Federal Indian	19.7	67.2	13.1	61
Public Whites	13.3	67.1	19.6	143
Public Indian	15.4	82.0	2.6	39
Mission Indian				
Grade 6				
Federal Indian	30.9	58.2	10.9	55
Public Whites	14.9	65.8	19.3	114
Public Indian	25.0	62.5	12.5	24
Mission Indian				
Grade 7				
Federal Indian	34.3	57.4	8.3	108
Public Whites	11.8	55.5	32.7	110
Public Indian	11.4	74.3	14.3	35
Mission Indian				
Grade 8				
Federal Indian	27.9	63.6	8.5	129
Public Whites	11.5	61.8	26.7	165
Public Indian	12.1	78.8	9.1	33
Mission Indian				
Grade 9				
Federal Indian	20.8	73.6	5.6	231
Public Whites	8.5	58.0	33.5	164
Public Indian	5.4	86.5	8.1	37
Mission Indian				
Grade 10				
Federal Indian	26.8	64.0	9.2	317
Public Whites	10.5	55.5	34.0	153
Public Indian	5.0	80.0	15.0	20
Mission Indian				
Grade 11				
Federal Indian	22.3	69.1	8.6	256
Public Whites	12.7	55.0	32.3	158
Public Indian	4.0	76.0	20.0	25
Mission Indian				
Grade 12				
Federal Indian	17.0	71.1	11.9	218
Public Whites	9.8	61.0	29.2	123
Public Indian		87.5	12.5	16
Mission Indian				

Figure IV-34

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Spelling

Anadarko Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	28.3	49.1	22.6	53
Public Whites	21.6	53.6	24.8	125
Public Indian	9.7	51.6	38.7	31
Mission Indian				
Grade 5				
Federal Indian	21.3	45.9	32.8	61
Public Whites	22.4	57.3	20.3	143
Public Indian	28.2	48.7	23.1	39
Mission Indian				
Grade 6				
Federal Indian	25.5	58.2	16.3	55
Public Whites	21.9	64.1	14.0	114
Public Indian	20.8	58.4	20.8	24
Mission Indian				
Grade 7				
Federal Indian	21.3	60.2	18.5	108
Public Whites	15.5	74.5	10.0	110
Public Indian	17.1	60.0	22.9	35
Mission Indian				
Grade 8				
Federal Indian	21.7	61.2	17.1	129
Public Whites	17.6	66.0	16.4	165
Public Indian	24.2	48.5	27.3	33
Mission Indian				
Grade 9				
Federal Indian	14.7	65.0	20.3	231
Public Whites	19.5	64.6	15.9	164
Public Indian	2.7	75.7	21.6	37
Mission Indian				
Grade 10				
Federal Indian	18.6	60.9	20.5	317
Public Whites	19.6	58.8	21.6	153
Public Indian	20.0	55.0	25.0	20
Mission Indian				
Grade 11				
Federal Indian	20.3	59.0	20.7	256
Public Whites	13.3	68.3	18.4	158
Public Indian	12.0	76.0	12.0	25
Mission Indian				
Grade 12				
Federal Indian	16.5	66.0	17.5	218
Public Whites	16.3	66.6	17.1	123
Public Indian	12.5	75.0	12.5	16
Mission Indian				

Figure IV-35

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Total Score

Anadarko Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
		Grade 4		
Federal Indian	41.5	47.2	11.3	53
Public Whites	9.6	69.6	20.8	125
Public Indian	12.9	74.2	12.9	31
Mission Indian				
		Grade 5		
Federal Indian	23.0	72.1	4.9	61
Public Whites	9.8	70.6	19.6	143
Public Indian	15.4	79.5	5.1	39
Mission Indian				
		Grade 6		
Federal Indian	27.3	61.8	10.9	55
Public Whites	7.0	76.3	16.7	114
Public Indian	20.8	79.2		24
Mission Indian				
		Grade 7		
Federal Indian	24.1	71.3	4.6	108
Public Whites	7.3	68.2	24.5	110
Public Indian	11.4	80.0	8.6	35
Mission Indian				
		Grade 8		
Federal Indian	23.3	69.7	7.0	129
Public Whites	10.9	65.5	23.6	165
Public Indian	21.2	75.8	3.0	33
Mission Indian				
		Grade 9		
Federal Indian	22.1	73.6	4.3	231
Public Whites	13.4	57.3	29.3	164
Public Indian	8.1	78.4	13.5	37
Mission Indian				
		Grade 10		
Federal Indian	24.0	68.8	7.2	317
Public Whites	7.8	60.8	31.4	153
Public Indian	5.0	80.0	15.0	20
Mission Indian				
		Grade 11		
Federal Indian	21.5	64.4	14.1	256
Public Whites	7.0	65.8	27.2	158
Public Indian	16.0	68.0	16.0	25
Mission Indian				
		Grade 12		
Federal Indian	18.8	71.1	10.1	218
Public Whites	9.8	58.5	31.7	123
Public Indian		81.3	18.7	16
Mission Indian				

Figure IV-36

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Reading Vocabulary

Muskogee Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
		Grade 4		
Federal Indian	14.2	71.6	14.2	120
Public Whites	25.9	56.5	17.6	170
Public Indian	31.9	63.8	4.3	69
Mission Indian				
		Grade 5		
Federal Indian	24.7	68.6	6.7	89
Public Whites	12.2	64.8	23.0	196
Public Indian	23.5	62.9	13.6	81
Mission Indian				
		Grade 6		
Federal Indian	28.6	66.9	4.5	112
Public Whites	12.8	63.6	23.6	195
Public Indian	21.8	67.8	10.4	87
Mission Indian				
		Grade 7		
Federal Indian	25.0	66.1	8.9	112
Public Whites	15.6	60.3	24.1	141
Public Indian	10.2	72.8	17.0	59
Mission Indian				
		Grade 8		
Federal Indian	25.0	63.9	11.1	108
Public Whites	16.1	59.4	24.5	143
Public Indian	13.0	68.5	18.5	54
Mission Indian				
		Grade 9		
Federal Indian	21.0	73.1	5.9	119
Public Whites	16.3	61.4	22.3	283
Public Indian	27.9	65.8	6.3	79
Mission Indian				
		Grade 10		
Federal Indian	18.9	71.7	9.4	53
Public Whites	10.8	73.5	15.7	249
Public Indian	10.4	70.8	18.8	48
Mission Indian				
		Grade 11		
Federal Indian	20.0	80.0		30
Public Whites	7.9	65.4	26.7	165
Public Indian	20.0	57.1	22.9	35
Mission Indian				
		Grade 12		
Federal Indian	35.5	64.5		31
Public Whites	12.8	66.3	20.9	172
Public Indian	14.3	66.6	19.1	21
Mission Indian				

Figure IV-37

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Reading Comprehension

Muskogee Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	18.3	61.7	20.0	120
Public Whites	18.2	64.1	17.7	170
Public Indian	8.7	75.4	15.9	69
Mission Indian				
Grade 5				
Federal Indian	35.9	56.2	7.9	89
Public Whites	14.8	65.3	19.9	196
Public Indian	22.2	67.9	9.9	81
Mission Indian				
Grade 6				
Federal Indian	25.9	63.4	10.7	112
Public Whites	13.3	57.5	29.2	195
Public Indian	14.9	69.0	16.1	87
Mission Indian				
Grade 7				
Federal Indian	20.5	68.8	10.7	112
Public Whites	22.7	53.2	24.1	141
Public Indian	13.6	67.8	18.6	59
Mission Indian				
Grade 8				
Federal Indian	21.3	62.0	16.7	108
Public Whites	14.0	59.4	26.6	143
Public Indian	24.1	53.7	22.2	54
Mission Indian				
Grade 9				
Federal Indian	18.5	66.4	15.1	119
Public Whites	14.1	61.5	24.4	283
Public Indian	25.3	64.6	10.1	79
Mission Indian				
Grade 10				
Federal Indian	13.2	66.0	20.8	53
Public Whites	14.9	66.2	18.9	249
Public Indian	10.4	75.0	14.6	48
Mission Indian				
Grade 11				
Federal Indian	23.3	73.4	3.3	30
Public Whites	13.9	63.7	22.4	165
Public Indian	25.7	54.3	20.0	35
Mission Indian				
Grade 12				
Federal Indian	16.1	80.7	3.2	31
Public Whites	16.9	63.3	19.8	172
Public Indian	33.3	38.1	28.6	21
Mission Indian				

Figure IV-38

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Arithmetic Reasoning

Muskogee Area

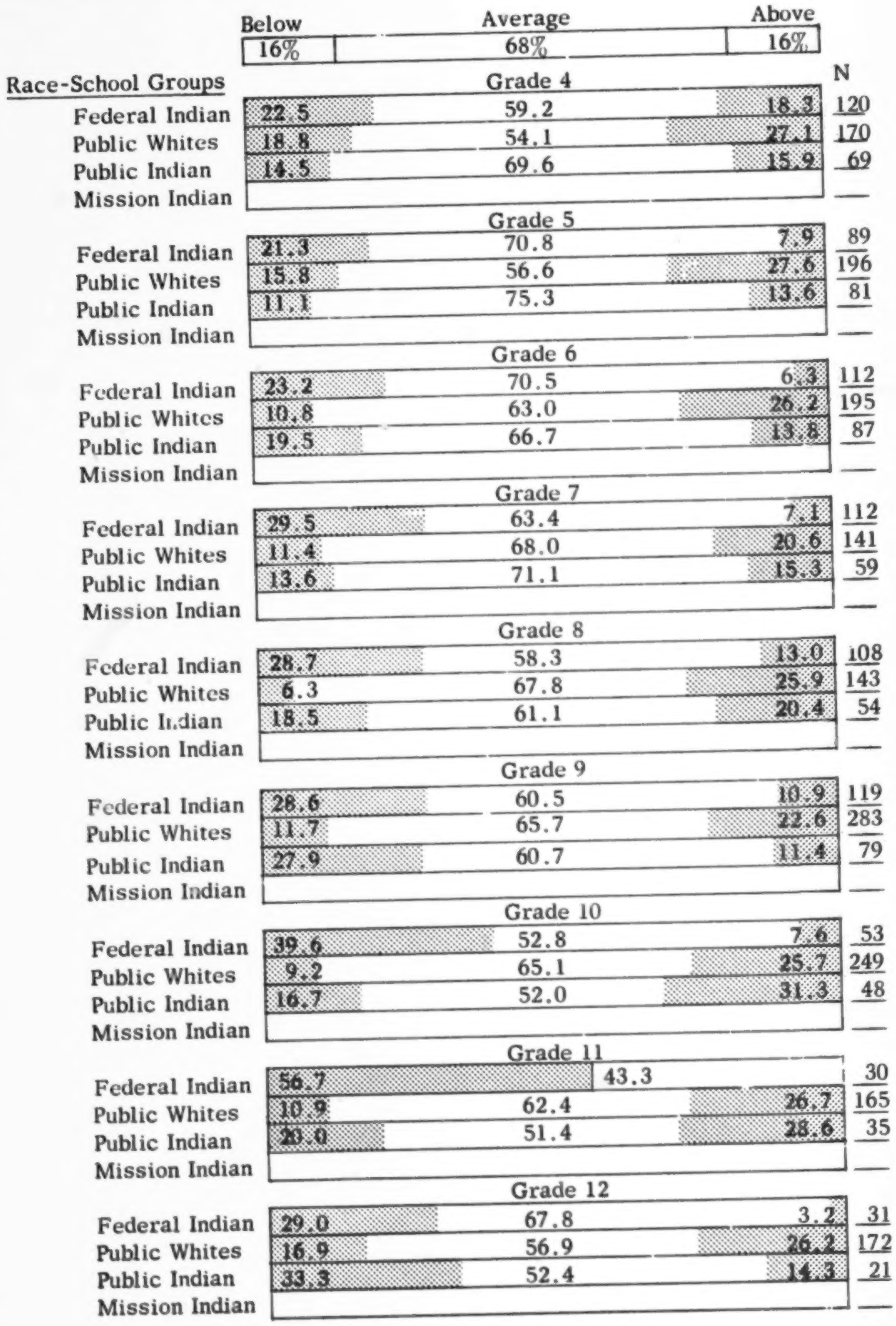


Figure IV-39

PERCENTAGES IN ACHIEVEMENT LEVELS

By Race - School Groups

Arithmetic Fundamentals — Muskogee Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	16.7	53.3	30.0	120
Public Whites	12.4	69.4	18.2	170
Public Indian	17.4	69.6	13.0	69
Mission Indian				
Grade 5				
Federal Indian	20.2	56.2	23.6	89
Public Whites	15.3	58.2	26.5	196
Public Indian	16.1	65.4	18.5	81
Mission Indian				
Grade 6				
Federal Indian	26.8	62.5	10.7	112
Public Whites	12.8	49.2	38.0	195
Public Indian	17.3	56.3	26.4	87
Mission Indian				
Grade 7				
Federal Indian	26.8	64.3	8.9	112
Public Whites	12.8	58.8	28.4	141
Public Indian	15.3	71.2	13.5	59
Mission Indian				
Grade 8				
Federal Indian	26.9	53.7	19.4	108
Public Whites	13.3	63.6	23.1	143
Public Indian	29.6	51.9	18.5	54
Mission Indian				
Grade 9				
Federal Indian	19.3	70.6	10.1	119
Public Whites	15.9	69.6	14.5	283
Public Indian	27.9	64.5	7.6	79
Mission Indian				
Grade 10				
Federal Indian	22.6	66.1	11.3	53
Public Whites	16.1	59.8	24.1	249
Public Indian	20.8	47.9	31.3	48
Mission Indian				
Grade 11				
Federal Indian	26.7	70.0	3.3	30
Public Whites	10.3	64.9	24.8	165
Public Indian	20.0	51.4	28.6	35
Mission Indian				
Grade 12				
Federal Indian	16.1	77.4	6.5	31
Public Whites	19.8	55.8	24.4	172
Public Indian	28.6	57.1	14.3	21
Mission Indian				

Figure IV-40

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Language

Muskogee Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	15.8	58.4	25.8	120
Public Whites	18.8	67.7	13.5	170
Public Indian	17.4	68.1	14.5	69
Mission Indian				—
Grade 5				
Federal Indian	28.1	66.3	5.6	89
Public Whites	11.2	60.7	28.1	196
Public Indian	18.5	65.4	16.1	81
Mission Indian				—
Grade 6				
Federal Indian	22.3	67.0	10.7	112
Public Whites	18.0	64.6	17.4	195
Public Indian	17.3	63.2	19.5	87
Mission Indian				—
Grade 7				
Federal Indian	24.1	65.2	10.7	112
Public Whites	11.4	63.8	24.8	141
Public Indian	10.2	78.0	11.8	59
Mission Indian				—
Grade 8				
Federal Indian	26.9	63.8	9.3	108
Public Whites	9.8	61.5	28.7	143
Public Indian	20.4	50.0	29.6	54
Mission Indian				—
Grade 9				
Federal Indian	25.2	68.1	6.7	119
Public Whites	12.0	68.9	19.1	283
Public Indian	30.4	56.9	12.7	79
Mission Indian				—
Grade 10				
Federal Indian	15.1	60.4	24.5	53
Public Whites	12.1	57.0	30.9	249
Public Indian	8.3	66.7	25.0	48
Mission Indian				—
Grade 11				
Federal Indian		90.0	10.0	30
Public Whites	12.1	59.4	28.5	165
Public Indian	11.4	62.9	25.7	35
Mission Indian				—
Grade 12				
Federal Indian		77.4	22.6	31
Public Whites	18.0	61.1	20.9	172
Public Indian	14.3	47.6	38.1	21
Mission Indian				—

Figure IV-41

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Spelling

Muskogee Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
Grade 4				
Federal Indian	15.8	62.5	21.7	120
Public Whites	15.3	64.7	20.0	170
Public Indian	1.5	85.5	13.0	69
Mission Indian				—
Grade 5				
Federal Indian	14.6	74.2	11.2	89
Public Whites	20.4	55.6	24.0	196
Public Indian	14.8	58.0	27.2	81
Mission Indian				—
Grade 6				
Federal Indian	22.3	60.7	17.0	112
Public Whites	22.1	61.0	16.9	195
Public Indian	19.5	63.2	17.3	87
Mission Indian				—
Grade 7				
Federal Indian	29.5	52.6	17.9	112
Public Whites	21.3	61.7	17.0	141
Public Indian	13.6	57.6	28.8	59
Mission Indian				—
Grade 8				
Federal Indian	20.4	65.7	13.9	108
Public Whites	25.9	50.3	23.8	143
Public Indian	31.5	50.0	18.5	54
Mission Indian				—
Grade 9				
Federal Indian	16.0	62.2	21.8	119
Public Whites	21.9	58.3	19.8	283
Public Indian	21.5	60.8	17.7	79
Mission Indian				—
Grade 10				
Federal Indian	15.1	62.3	22.6	53
Public Whites	23.7	62.2	14.1	249
Public Indian	16.7	56.2	27.1	48
Mission Indian				—
Grade 11				
Federal Indian	20.0	73.3	6.7	30
Public Whites	18.8	64.2	17.0	165
Public Indian	25.7	51.4	22.9	35
Mission Indian				—
Grade 12				
Federal Indian	3.2	77.4	19.4	31
Public Whites	25.0	60.5	14.5	172
Public Indian	14.3	61.9	23.8	21
Mission Indian				—

Figure IV-42

PERCENTAGES IN ACHIEVEMENT LEVELS
By Race - School Groups

Total Score

Muskogee Area

Race-School Groups	Below 16%	Average 68%	Above 16%	N
		Grade 4		
Federal Indian	18.3	60.0	21.7	120
Public Whites	19.4	60.6	20.0	170
Public Indian	20.3	69.6	10.1	69
Mission Indian				
		Grade 5		
Federal Indian	25.8	68.6	5.6	89
Public Whites	13.8	61.2	25.0	196
Public Indian	13.6	67.9	18.5	81
Mission Indian				
		Grade 6		
Federal Indian	23.2	71.4	5.4	112
Public Whites	12.3	59.5	28.2	195
Public Indian	18.4	63.2	18.4	87
Mission Indian				
		Grade 7		
Federal Indian	23.2	66.1	10.7	112
Public Whites	12.1	61.7	26.2	141
Public Indian	8.5	77.9	13.6	59
Mission Indian				
		Grade 8		
Federal Indian	22.2	66.7	11.1	108
Public Whites	13.3	58.0	28.7	143
Public Indian	24.1	53.7	22.2	54
Mission Indian				
		Grade 9		
Federal Indian	26.9	58.8	14.3	119
Public Whites	19.4	52.0	28.6	283
Public Indian	31.6	54.5	13.9	79
Mission Indian				
		Grade 10		
Federal Indian	22.6	68.0	9.4	53
Public Whites	11.6	66.3	22.1	249
Public Indian	10.4	68.8	20.8	48
Mission Indian				
		Grade 11		
Federal Indian	23.3	73.4	3.3	30
Public Whites	9.7	64.8	25.5	165
Public Indian	20.0	54.3	25.7	35
Mission Indian				
		Grade 12		
Federal Indian	9.7	90.3		31
Public Whites	16.9	63.3	19.8	172
Public Indian	28.6	47.6	23.8	21
Mission Indian				

every grade level than that of white pupils in the public schools of the Muskogee Area. This means, of course, that the white and the Indian pupils are much more like each other with respect to the basic skills in the Muskogee Area than they are in the Aberdeen Area.

It is also of interest to note that Indian pupils in Federal schools in the Anadarko Area achieve on the average at about the same level as white pupils in public schools in the Albuquerque Area in grades four through nine. Furthermore, the average achievement of Indian pupils in Federal schools in the Anadarko Area is at least as high as it is for Indian pupils in public schools in the Billings Area in grades four through nine. In turn Indian pupils who attend mission schools in the Aberdeen Area achieve on the average at least as high as public school Indian pupils in the Billings Area at every grade level. An examination of the tables of mean raw scores in Appendix C will verify the accuracy of the above statements.

The comparisons made in the two paragraphs preceding are by no means exhaustive but surely they support the contention that type of school, alone, is not a controlling factor in determining level of achievement of pupils.

Some Conclusions

The Bureau of Indian Affairs has committed itself to a policy of arranging for the transfer of Indian children from Federal to public schools as rapidly as is feasible. This transfer has been going on for many years and is at present being accelerated. One reason for this is that public education in America has historically and traditionally been a State and local function. As Indian people become integrated with the non-Indian community around them, their children will attend the schools provided by that community. Furthermore, it seems logical to suppose that as Indian children associate daily with non-Indian children they will learn from them. This undoubtedly happens in most cases.

The logic expressed above is not necessarily irrefutable in all cases, however. The social climate of the school to which the Indian child transfers needs to be hospitable and sympathetic. Teaching materials and methods need to be adapted to the needs of the Indian child if his needs are different from those of his non-Indian classmates. Otherwise he may be repelled by his school experience rather than helped by it. In any case the unique contribution which the public school can make to the Indian child, and which the Federal school is unable to make, is the **opportunity** to associate with and learn from the non-Indian pupils.

It would seem wise for the Bureau to evaluate as carefully as it can the relative levels of educational achievement and acculturation of the pupils of both the Federal and the public school **before** Indian pupils are transferred from one to the other. By so doing it might avoid educational and cultural gaps which tend to operate against the success of Indian pupils and may contribute to their dropping out of school.

CHAPTER V

A COMPARISON OF THE ACHIEVEMENT OF PUPILS IN THE SEVERAL SKILLS

In the preceding chapter a comparison of the achievement of the pupils in the study was made by race-school groups. It was apparent that, in general, the white pupils in the public schools made higher scores on the tests than did any of the Indian groups. The purpose of this chapter is to discover whether the superiority of white pupils over Indian pupils was equally distributed over all the skills tested, or whether Indian pupils did better by comparison with their white contemporaries in some skills than in others.

FEDERAL SCHOOL INDIAN PUPILS AND PUBLIC SCHOOL WHITE PUPILS COMPARED

In order to keep the comparison as uncomplicated as possible, two groups have been selected for this purpose: white pupils in public schools and Indian pupils in Federal schools. These are the two largest groups for the entire six-area study. Figure V-1 depicts this comparison. In this diagram the relative achievement of the two groups, by areas and by grades, is treated for each of the six basic skills. A check mark appears wherever, in any area at any grade level, the average score of Indian pupils in Federal schools was higher than, or not significantly different from, the average score of white pupils in public schools. Because the number of Federal school Indian pupils was too small, no comparisons higher than the sixth grade were possible in the Billings Area. In the Phoenix Area there were insufficient numbers of public school white pupils in the twelfth grade to permit a comparison. As a result a total of 47 comparisons were possible for each skill.

The Comparison By Skills

It will be noted that, on the basis described above, reading vocabulary and spelling represent the extremes of the six skills. In reading vocabulary the Indian pupils compare favorably[1] with the white pupils in only 4 of 47 possible comparisons. By contrast, the Indian pupils do as well as, if not better than, the white pupils in 29 of 47 possible comparisons in spelling.

The Indian pupils made their second best showing in arithmetic fundamentals where they stood favorably with the white pupils in 14 of 47 comparisons. The comparisons were favorable to the Indian pupils in 12 of 47 cases in reading comprehension, 10 of 47 cases in language, and in only 7 of 47 cases in arithmetic reasoning.

The Comparison By Areas

It is interesting to note that in no skill at any grade level did the Indian pupils do as well as the white pupils in the Aberdeen Area, and that they did as well in only 2 of a possible 18 comparisons in the Billings Area. On the other hand, in the Muskogee Area the Indian pupils were better than, or not different from, white pupils in 24, or 44.4 percent, of 54 comparisons. The Indian pupils in the Albuquerque Area did almost as well, comparing favorably with white pupils in 22, or 40.3 percent, of 54 cases. Favorable comparisons for the Anadarko and Phoenix Areas numbered 15 of 54 and 13 of 48, respectively.

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[1] The term "favorably" is used to indicate that the average score of Indian pupils was higher than, or not significantly lower than, the average score of the white pupils with whom they were being compared.

Figure V-1

FAVORABLE COMPARISONS OF INDIAN PUPILS IN FEDERAL SCHOOLS WITH WHITE PUPILS IN PUBLIC SCHOOLS

READING VOCABULARY

Grade	Phoenix	Albuquerque	Aberdeen	Billings	Muskogee	Anadarko
4	x	x			x	
5						
6	x					
7				--		
8				--		
9				--		
10				--		
11				--		
12	--			--		

READING COMPREHENSION

Grade	Phoenix	Albuquerque	Aberdeen	Billings	Muskogee	Anadarko
4	x	x			x	
5						
6		x			x	
7		x		--	x	
8				--		
9		x		--		
10				--	x	
11				--		x
12	--			--	x	x

ARITHMETIC REASONING

Grade	Phoenix	Albuquerque	Aberdeen	Billings	Muskogee	Anadarko
4	x	x		x	x	
5						
6		x				
7				--		
8				--		
9				--		
10				--		
11		x		--		
12	--	x		--		

Figure V-1 (continued)

ARITHMETIC FUNDAMENTALS

Grade	Phoenix	Albuquerque	Aberdeen	Billings	Muskogee	Anadarko
4	x	x		x	x	x
5	x				x	x
6		x				
7				--		
8				--	x	
9		x		--	x	
10				--		
11		x		--		
12	--	x		--		

LANGUAGE

Grade	Phoenix	Albuquerque	Aberdeen	Billings	Muskogee	Anadarko
4	x	x			x	
5						x
6		x				x
7				--		
8				--		
9				--		
10	x			--	x	
11				--	x	
12	--			--	x	

SPELLING

Grade	Phoenix	Albuquerque	Aberdeen	Billings	Muskogee	Anadarko
4		x			x	x
5	x	x			x	x
6	x	x			x	x
7		x		--	x	x
8		x		--	x	x
9	x			--	x	x
10	x			--	x	x
11	x			--	x	x
12	--	x		--	x	x

Inter-area comparisons, such as those made in the preceding paragraph, have been treated in Chapters III and IV and are mentioned again here only to emphasize that differences or similarities of the two racial groups in the several skills were not evenly distributed over all of the six areas.

The Comparison By Grade Levels

It is also of note that of the 282 comparisons shown in Figure V-1, 21, or 27.3 percent, of the 76 which are favorable to Indian pupils occurred in grade four, and 40 of the 76 were at the elementary level: grades four, five, and six. The intermediate level, grades seven, eight, and nine, shows the Indian pupils to the least advantage, only 15 of 90 comparisons being favorable to them. At the advanced level, grades ten, eleven, and twelve, 22 of the 84 comparisons show the Indian pupils to be higher than, or not significantly different from, the white pupils.

SUGGESTED POSSIBLE CAUSES OF THE DIFFERENCES

As has been suggested before, test data show only **what** is true and not necessarily **why** it is true. Facts concerning achievement do form a basis for consideration of the differences involved in the teaching of the several skills and of the "out-of-school" factors which may influence learning in one skill differently from that in another.

The performance of Indian pupils in reading vocabulary and in spelling provides a striking contrast. Why, when measured against white children, should the Indian pupils do so much better in spelling than in vocabulary? Many persons, when confronted with such a question, are quick to reply that apparently spelling is being "better taught." Such a statement shifts the emphasis from problems of learning to methods of teaching and implies that several hundred teachers in Federal schools compare more favorably with their public school colleagues in the teaching of spelling than in the development of pupils' vocabulary. Are we to suppose then, that if Federal school teachers transferred to public school jobs their white pupils would be "better taught" in spelling than in reading vocabulary? Such a conclusion would seem to be absurd.

Differences in the Learning Processes

Reading Vocabulary Versus Spelling. It is undoubtedly true, however, that most pupils, regardless of race, acquire spelling skills in a more exclusively formalized learning situation than they do word meanings. Spelling has traditionally been taught by drill methods, with lists of words being assigned, "learned," and reviewed. While word meanings can likewise be acquired by this formal approach to learning, most children, given opportunity, add tremendously to their vocabularies through various media such as independent reading, conversation, radio, television, motion pictures, and in numerous other ways. The child for whom this "out-of-school" learning opportunity is not present is, of course, at a serious disadvantage when being compared with a child who has such opportunity.

The Spelling Section of the California Achievement Test. At this time it might be well to consider the spelling section of the California Achievement Test itself. This section consists of thirty items at each of the three levels. In taking this test the pupil is not required to actually spell the word. Rather, he is required to identify one misspelled word out of four words presented in each item, or, if the item does not contain a misspelled word to so indicate. Obviously this is not a very direct approach to the testing of spelling, although it is a commonly accepted procedure. Whether it obtains valid results is open to question. The test method is, in fact, a concession to ease and speed of test administration and scoring.

In any case it would seem that visual imagery and form perception play a significant part in this type of spelling test or, for that matter, in any sort of spelling test or test of word recognition. Most of us from time to time upon writing a word will say, "That just doesn't 'look' right." Persons with a high aptitude for visualizing the form of words may do relatively well on this spelling test or in spelling generally. This may be true even though they do not know the meaning of the word, as long as they have had an opportunity to see the word previously. Whether or not Indian children tend to possess this aptitude in a greater degree than white children is a question that awaits further study. Most persons who have worked with Indian children for a considerable period of time believe that there is among them a higher incidence of individuals who can sketch or draw accurately from memory things they have seen than is true of the general population of school children.

Arithmetic Reasoning Versus Arithmetic Fundamentals. The achievement of Indian pupils in the two arithmetic skills presents another interesting contrast. The fourteen comparisons favorable to Indian pupils in arithmetic fundamentals was second highest among the six skills, while the seven favorable comparisons in arithmetic reasoning was second from the lowest.[2] How do the learning processes differ for these two skills? It can perhaps be agreed that the learning of arithmetic fundamentals or computational procedures is much more within the control of the school than is true of arithmetic reasoning. Number combinations have been traditionally taught in schools with the aid of drill procedures. Seldom does a child learn these combinations or routine arithmetic procedures in the home to the same extent as we have pointed out may happen in the case of word meanings. If this is true, then the child with the more culturally sparse home and community background is not at as much of a disadvantage, when his achievement in arithmetic fundamentals is compared with that of other children, as he may be in the case of vocabulary. What, however, of arithmetic reasoning or problem solving? Here quantitative concepts come into play as well as the relationships between factors in a problem. The grasp of such concepts and the understanding of such relationships may be greatly influenced by the child's background of experience. For example, one of the items in the arithmetic reasoning section of the elementary battery reads, "Bob paid $2.25 for a new tire, 75 cents for a seat, and 50 cents for paint. He had $4.00 to repair his bicycle. How much did he have left?" It seems likely that the child who owns a bicycle or some other property and has had the responsibility for repairing it out of his own allowance might have an advantage in solving this problem.

It is evident, too, that the solving of "thought" problems requires some skill in reading comprehension. If the pupil's skill in reading comprehension is low, his achievement in arithmetic reasoning may suffer to some extent as a result.

It must be pointed out, however, that the arithmetic reasoning section of the California Achievement Test includes items covering such things as Roman numerals, arithmetic symbols, and the conversion of numbers, expressed in words, into figures. Also, at the intermediate and advanced levels some items involving algebraic concepts are included and at the advanced level several of the items require a rudimentary knowledge of plane geometry. It is difficult to believe that cultural factors would place any additional handicap on Indian children in learning such material. However, a comparison of courses of study of Federal and public schools might reveal that the Indian pupils are less likely to be taught algebra and geometry than are the white pupils. This is not to say that the Federal school curriculum **should** contain more algebra or geometry for **all** pupils, but it would help to explain the relatively weak showing of the Indian pupils in mathematics reasoning.

Reading Comprehension Versus Reading Vocabulary. It is also significant that the Indian pupils did better in relation to white pupils in reading comprehension than they did in reading vocabulary. This fact may seem strange to many teachers since a knowledge of word meanings is usually considered the most important single element in comprehending what is read. The writers do not claim to know all of the reasons for the differences noted above, but it can be pointed out that knowing the meaning of a word standing by itself is quite a different thing from knowing the meaning of a word which is part of a phrase or sentence. By intelligent and skillful employment of context clues, a pupil may deduce the meaning of an unfamiliar word by noting its relationship to other words, or groups of words, the meaning of which he does know. One outstanding teacher who has seen the data has observed that while a pupil's vocabulary may be small in scope because of lack of experience, he may have good recognition of the words he does know and thus be able to employ context clues quite effectively. In any case, it would seem that if the reading vocabularies of Indian children can be strengthened their reading comprehension will surely be improved.

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[2] While it is true that the difference between these two skills does not meet the requirement for "statistical significance," it approaches it very nearly.

The Importance of Thinking About the Problem. It should not be inferred that the writers have attempted in the foregoing paragraphs to make an exhaustive analysis of the factors which caused differences in the achievement of Indian and white pupils as among the several skills. Each teacher will have some ideas of her own on this point and teacher groups may explore the problem together with great profit. The writers have attempted here to make some suggestions which may stimulate the thinking of teachers and prompt them to further investigation. It is clear that differences do exist and it can scarcely be doubted that they are important in the education of Indian children.

CHAPTER VI

THE INFLUENCE OF CULTURAL AND ENVIRONMENTAL FACTORS ON ACHIEVEMENT

In Chapter IV we observed that the race-school groups of pupils in this study arrange themselves into a general order or hierarchy of achievement. This order is:

1. White pupils in public schools
2. Indian pupils in public schools
3. Indian pupils in Federal schools
4. Indian pupils in mission schools

What light can be shed on the causes of these differences? In this chapter we will investigate separately the relationship of a number of cultural and environmental factors to achievement. The investigators felt that these were some of the factors which might influence achievement. It was recognized, of course, that there are other such factors not dealt with in this study; for example, individual intelligence. Since it has not been possible to hold all other factors constant while investigating a single factor, we are not in a position to say positively that the relationship of any one factor to achievement is one of cause and effect.

Before proceeding, however, three points need to be made clear. **First,** there were great differences in level of achievement among **individual pupils** in the same area, in the same type of school, and of the same race. For that matter, these individual pupil differences were usually large within the same grade of the same school. Basically, however, we are not treating differences between individual pupils in this study, although Chapters VII and VIII will be devoted to describing ways of determining individual pupil differences and taking effective action in the light of such knowledge. **Second,** there were undoubtedly marked differences in the level of achievement among the **individual schools** participating in the study, but the data are not treated in such a way as to differentiate among individual schools. This **could** be done from the data at hand and it is suggested that it **should** be done whenever a transfer of the pupils of one of the participating schools to another is contemplated in the future. **Third,** the differences we are discussing here are characteristic of **large groups** of individual pupils enrolled in a large number of individual schools. We are concerned with the factors related to such differences in achievement because we believe that by studying them we may better understand the factors which influence the learning of children everywhere.

It scarcely can be doubted that there were wide differences in the **quality** of the **schools** that participated. Teachers are not all equally well trained and equally effective. Some schools have better planned curricula than do others. The teaching materials and equipment in one school may be much superior to those in another. Furthermore, the writers are entirely convinced that the quality of a school and its instructional program has much to do with how well or how much its pupils learn. It must be pointed out, however, that differences which are wholly individual in character, whether of pupils, teachers, or schools, probably tend to approach a normal distribution when taken together for an entire administrative area of this study. The good quality of some will counterbalance the poor quality of others.

Still we are faced with the hierarchy of achievement of race-school groups set out at the beginning of this chapter. What thread of influence runs through these groups and accounts for these rather clear-cut differences? It might be supposed, as was pointed out in Chapter IV, that the instructional programs of the three administrative types of schools differ markedly enough from each other in quality to account **alone** for the differences in achievement. One fact stands as a bar to such a conclusion. If the instructional program of the school **alone** controls the level of achievement of pupils, why do Indian children who attend public schools not achieve as high as do white children who attend public schools? And yet they do not do so in any one of the six administrative areas included in this study.

DEGREE OF INDIAN BLOOD AND PRE-SCHOOL LANGUAGE

Manifestly, we must look beyond the instructional programs of the schools for an explanation of the differences in achievement among the race-school groups. What of the pupils themselves? Are the pupils who comprise the various race-school groups different from each other, on the average, in any basic respects? An examination of Tables 6-a through 6-g will disclose that in two particulars they are strikingly different from each other .

Table 6-a shows the percentages of full-blood pupils in each of the three Indian groups: Federal school, public school, and mission school. In each of the six administrative areas a smaller percentage of the Indian pupils attending public school were full-bloods than was true for either Federal or mission schools, with one exception. This occurred in the Aberdeen Area where the mission schools enrolled a smaller proportion of full-bloods than did either the Federal or public schools. In the Albuquerque and Billings Areas the mission schools enrolled an even higher percentage of full-blood pupils than did the Federal schools, and in the Phoenix Area the proportion was very little lower.

Tables 6-b through 6-g show in percentages, by areas and by grades, the pre-school language spoken by each of the race-school groups. Without exception a larger percentage of Indian pupils in public schools spoke only English and a smaller percentage spoke only some other tongue than was true for Indian pupils attending Federal schools. As a general rule even fewer Indian pupils attending mission schools spoke only English and more spoke only some other language, prior to school entrance, than was the case with Indian pupils attending Federal schools. Again, a notable exception to this rule occurred in the Aberdeen Area where the situation was reversed. In all areas except Albuquerque a great preponderance of the non-Indian children spoke only English prior to school entrance and a minute percentage spoke only some language other than English. Even in the Albuquerque Area a far higher percentage of the non-Indian pupils in the public schools spoke only English prior to entering school than was.true for any of the Indian groups.

Thus, on the bases of full-blood pupils and pre-school language the race-school groups arrange themselves into hierarchies which **coincide** with the hierarchy of achievement. That is, the higher achieving groups enrolled a smaller percentage of full-blood pupils, a smaller percentage of pupils not speaking any English prior to school entrance, and a higher percentage of pupils speaking only English prior to starting to school.

Degree of Blood and Pre-School Language as Indices of Acculturation

It should be made clear that the writers do not believe that blood quantum and pre-school language in themselves are strong determiners of achievement. They do believe that these two characteristics are excellent indices, on the whole, of the stage of acculturation of the groups of pupils. Finally, they believe that the extent to which a family or community has integrated itself with the dominant culture of the nation has a very great influence upon the school achievement of its children.

The foregoing statement needs clarification in several respects. Many full-blooded Indians are completely acculturated and have reached a high level of sophistication. In general, however, it is probable that the white person, or the person of mixed-blood has had greater opportunity to acquire the attributes of the major culture, of which knowledge of the English language is one, but only one.

There is evidence available which indicates that by the fourth grade level the school may be successful in overcoming in large part the pupil's handicap of lack of pre-school English in learning the basic skills. Later on, however, and particularly by grade six, the same pupils may again fall farther behind their classmates who come from English-speaking

TABLE 6-a

FULL-BLOOD INDIAN PUPILS, SHOWN BY ACTUAL NUMBERS AND BY PER CENT OF ALL INDIANS, BY AREAS, GRADES, AND SCHOOL TYPES

				Phoenix 1951		
Grade	N	Federal School	N	Public School	N	Mission School
4	182	95.8	34	72.3	60	92.3
5	174	93.0	30	88.2	53	94.6
6	148	96.1	31	77.5	72	92.3
7	164	89.1	11	64.7	55	90.2
8	135	91.2	14	82.3	52	80.0
9	52	89.7	8	42.1	38	84.4
10	80	87.9	8	53.3	19	86.4
11	47	85.5	5	50.0	13	86.7
12	30	96.8	1	25.0	11	84.6
Total	1012	92.3	142	70.0	373	88.8

				Albuquerque 1951		
Grade	N	Federal School	N	Public School	N	Mission School
4	319	93.0	9	56.3	36	94.7
5	265	94.6	6	58.2	45	88.2
6	286	95.3	11	42.3	62	93.9
7	220	87.3	50	73.5	67	98.5
8	211	90.6	32	68.0	54	96.4
9	196	89.0	34	69.4	10	90.9
10	112	71.8	19	82.6	12	100.0
11	111	91.0	19	86.4	11	100.0
12	76	96.2	14	87.5	12	92.3
	1796	90.5	194	69.3	309	94.8

				Aberdeen 1952		
Grade	N	Federal School	N	Public School	N	Mission School
4	184	36.5	37	33.3	28	18.9
5	204	42.9	39	37.5	32	21.6
6	176	38.3	35	33.3	29	20.4
7	141	32.7	20	21.1	24	18.9
8	113	27.1	15	21.7	13	12.5
9	99	33.0	13	20.1	10	10.4
10	70	29.4	12	13.8	14	15.2
11	48	28.6	12	21.1	5	23.1
12	48	31.6	4	9.3	3	7.5
Total	1083	34.4	187	25.5	158	17.1

				Billings 1953		
Grade	N	Federal School	N	Public School	N	Mission School
4	27	61.4	68	33.0	32	72.7
5	26	45.6	45	26.2	34	65.4
6	12	36.4	35	17.6	39	68.4
7	21	75.0	56	28.4	33	66.0
8	9	69.2	39	30.2	22	73.3
9	8	72.7	21	30.0	14	42.4
10	1	14.3	14	26.4	12	60.0
11	1	50.0	9	25.7	4	33.3
12	0	00.0	7	20.6	8	72.7
	105	53.3	294	28.0	198	64.1

		Muskogee 1954		
Grade	N	Federal School	N	Public School
4	94	80.3	48	69.6
5	61	72.6	29	35.8
6	83	79.0	40	46.0
7	88	80.0	37	46.8
8	64	62.7	33	47.1
9	77	65.8	52	49.1
10	32	60.4	21	43.8
11	19	63.3	19	46.3
12	20	64.5	6	26.1
Total	538	71.8	235	47.2

			Anadarko 1954	
Grade	N	Federal School	N	Public School
4	37	75.5	20	57.1
5	40	76.9	20	48.8
6	33	75.0	16	61.5
7	95	89.6	27	71.1
8	103	82.4	24	68.5
9	142	63.4	19	48.7
10	212	66.9	10	50.0
11	146	57.0	16	64.0
12	125	57.3	10	62.5
	933	67.1	162	58.9

TABLE 6-b

PRE-SCHOOL LANGUAGE PERCENTAGES BY AREAS, GRADES, AND RACE-SCHOOL GROUPS

PHOENIX

		Indian Pupils in Federal Schools				Indian Pupils in Public Schools				White Pupils in Public Schools				Indian Pupils in Mission Schools			
Grade		E	O	C	Total	E	O	C	Total	E	O	C	Total	E	O	C	Total
4	%	3.7	53.5	42.8		44.4	15.6	40.0		81.1	2.7	16.2		1.5	64.6	33.8	
	N	7	100	80	187	20	7	18	45	60	2	12	74	1	42	22	65
5	%	4.9	46.5	48.6		29.4	17.6	52.9		77.1	00.0	22.9		3.6	69.6	26.8	
	N	9	86	90	185	10	6	18	34	54	0	16	70	2	39	15	56
6	%	5.9	38.2	55.9		22.5	25.0	52.5		71.0	8.1	21.0		1.3	89.7	9.0	
	N	9	58	85	152	9	10	21	40	44	5	13	62	1	70	7	78
7	%	4.4	50.0	45.6		37.5	6.3	56.3		80.5	9.8	9.8		4.7	54.1	41.0	
	N	8	91	83	182	6	1	9	16	33	4	4	41	3	33	25	61
8	%	6.1	50.7	43.2		17.6	17.6	64.7		70.0	8.0	22.0		4.6	60.0	35.4	
	N	9	75	64	148	3	3	11	17	35	4	11	50	3	39	23	65
9	%	3.6	55.4	41.1		47.4	00.0	52.6		81.8	6.8	11.4		6.7	51.1	42.2	
	N	2	31	23	56	9	0	10	19	36	3	5	44	3	23	19	45
10	%	7.7	35.2	57.1		46.2	7.7	46.2		93.8	00.0	6.2		00.0	54.5	45.5	
	N	7	32	52	91	6	1	6	13	30	0	2	32	0	12	10	22
11	%	1.9	18.5	79.6		22.2	11.1	66.7		100.0	00.0	00.0		6.7	73.3	20.0	
	N	1	10	43	54	2	1	6	9	29	0	0	29	1	11	3	15
12	%	6.5	51.6	41.9		75.0	25.0	00.0		93.8	00.0	6.2		7.7	61.5	30.8	
	N	2	16	13	31	3	1	0	4	15	0	1	16	1	8	4	13
Total	%	5.0	45.9	49.1		34.5	15.2	50.3		80.4	4.3	15.3		3.6	66.0	30.5	
	N	54	499	533	1086	68	30	99	197	336	18	64	418	15	277	128	420

ALBUQUERQUE

Grade		Indian Pupils in Federal Schools E	O	C	Total	Indian Pupils in Public Schools E	O	C	Total	White Pupils in Public Schools E	O	C	Total	Indian Pupils in Mission Schools E	O	C	Total
4	%	7.3	66.9	25.8		6.3	50.0	43.8		32.2	36.8	30.9		00.0	73.0	27.0	
	N	25	228	88	341	1	8	7	16	98	112	94	304	0	27	10	37
5	%	2.9	65.4	31.8		7.7	30.8	61.5		29.9	30.3	39.8		3.9	72.5	23.5	
	N	8	183	89	280	1	4	8	13	72	73	96	241	2	37	12	51
6	%	2.7	53.0	44.3		12.0	44.0	44.0		31.2	26.3	42.5		7.6	63.6	28.8	
	N	8	158	132	298	3	11	11	25	83	70	113	266	5	42	15	66
7	%	3.6	42.1	54.4		7.4	16.2	76.5		33.2	23.3	43.5		1.5	82.4	16.2	
	N	9	106	137	252	5	11	52	68	100	70	131	301	1	56	11	68
8	%	3.9	37.3	58.8		8.5	38.3	53.2		39.2	28.5	32.3		3.7	77.8	22.2	
	N	9	87	137	233	4	18	25	47	124	90	102	316	2	42	12	54
9	%	5.9	43.2	50.9		10.2	18.4	71.4		33.9	28.4	37.6		18.2	45.5	36.4	
	N	13	95	112	220	5	9	35	49	118	99	131	348	2	5	4	11
10	%	4.5	52.9	42.6		13.0	17.4	69.6		48.7	28.6	22.7		16.7	50.0	33.3	
	N	7	82	66	155	3	4	16	23	58	34	27	119	2	6	4	12
11	%	5.0	69.4	25.6		13.6	4.5	81.8		36.8	25.0	38.2		9.1	36.4	54.5	
	N	6	84	31	121	3	1	18	22	28	19	29	76	1	4	6	11
12	%	1.3	75.9	22.8		00.0	18.8	81.2		39.3	10.1	50.6		8.3	25.0	66.7	
	N	1	60	18	79	0	3	13	16	35	9	45	89	1	3	8	12
Total	%	4.3	54.7	40.9		9.0	24.7	66.3		34.8	28.0	37.3		5.0	69.4	25.6	
	N	86	1083	810	1979	25	69	185	279	716	576	768	2060	16	222	82	320

TABLE 6-d

PRE-SCHOOL LANGUAGE PERCENTAGES BY AREAS, GRADES, AND RACE-SCHOOL GROUPS

ABERDEEN

Grade		Indian Pupils in Federal Schools				Indian Pupils in Public Schools				White Pupils in Public Schools				Indian Pupils in Mission Schools			
		E	O	C	Total	E	O	C	Total	E	O	C	Total	E	O	C	Total
4	%	46.3	14.2	39.5		58.7	11.0	30.3		95.6	.7	3.7		47.9	6.8	45.2	
	N	232	71	198	501	64	12	33	109	285	2	11	298	70	10	66	146
5	%	47.4	14.2	38.5		50.5	16.5	33.0		94.2	.6	5.1		64.2	3.4	32.4	
	N	224	67	182	473	52	17	34	103	295	2	16	313	95	5	48	148
6	%	58.8	9.9	31.4		60.0	7.6	32.4		92.5	1.1	6.5		57.1	5.0	37.9	
	N	268	45	143	456	63	8	34	105	258	3	18	279	80	7	53	140
7	%	51.7	6.5	41.7		58.9	5.3	35.8		95.2	.7	4.1		60.6	3.9	35.4	
	N	222	28	179	429	56	5	34	95	276	2	12	290	77	5	45	127
8	%	64.5	6.5	29.0		70.1	00.0	29.9		95.1	00.0	4.9		70.9	7.8	21.4	
	N	269	27	121	417	47	0	20	67	252	0	13	265	73	8	22	103
9	%	63.1	3.0	33.9		56.4	1.6	41.9		92.8	.3	6.9		76.0	4.2	19.8	
	N	188	9	101	298	35	1	26	62	282	1	21	304	73	4	19	96
10	%	65.5	3.0	31.5		64.0	3.5	32.6		90.2	.3	9.5		67.2	9.0	23.9	
	N	154	7	74	235	55	3	28	86	286	1	30	317	45	6	16	67
11	%	60.4	8.3	31.4		57.9	1.8	30.4		88.2	.8	11.0		68.6	3.9	27.5	
	N	102	14	53	169	38	1	17	56	232	2	29	263	35	2	14	51
12	%	59.2	3.9	36.8		88.4	00.0	11.6		88.1	.8	11.1		72.5	2.5	25.0	
	N	90	6	56	152	38	0	5	43	223	2	28	255	29	1	10	40
Total	%	55.9	8.8	35.4		61.7	6.5	31.8		92.5	.6	6.9		62.8	5.2	31.9	
	N	1749	274	1107	3130	448	47	231	726	2389	15	178	2582	577	48	293	918

TABLE 6-e

PRE-SCHOOL LANGUAGE PERCENTAGES BY AREAS, GRADES, AND RACE-SCHOOL GROUPS

BILLINGS

Grade		Indian Pupils in Federal Schools				Indian Pupils in Public Schools				White Pupils in Public Schools				Indian Pupils in Mission Schools			
		E	O	C	Total	E	O	C	Total	E	O	C	Total	E	O	C	Total
4	%	38.3	21.3	40.4		59.7	6.5	33.8		94.3	2.5	3.1		34.9	7.0	58.1	
	N	18	10	19	47	120	13	68	201	150	4	5	159	15	3	25	43
5	%	54.5	18.2	27.3		66.1	8.3	25.6		99.4	00.0	.6		36.5	3.8	59.6	
	N	30	10	15	55	111	14	43	168	163	0	1	164	19	2	31	52
6	%	45.5	21.2	33.3		63.8	3.9	32.2		98.7	00.0	1.3		35.1	7.0	57.9	
	N	15	7	11	33	97	6	49	152	150	0	2	152	20	4	33	57
7	%	14.8	29.6	55.6		65.5	6.2	28.4		98.5	00.0	1.5		26.0	12.0	62.0	
	N	4	8	15	27	127	12	55	194	128	0	2	130	13	6	31	50
8	%	7.7	30.8	61.5		63.6	4.7	31.8		98.2	00.0	1.8		10.3	10.3	79.3	
	N	1	4	8	13	82	6	41	129	109	0	2	111	3	3	23	29
9	%	27.3	27.3	45.5		75.7	2.9	21.4		98.8	00.0	1.2		45.5	3.0	51.5	
	N	3	3	5	11	53	2	15	70	81	0	1	82	15	1	17	33
10	%	42.9	00.0	57.1		81.0	3.8	15.1		98.8	1.2	00.0		35.0	5.0	60.0	
	N	3	0	4	7	43	2	8	53	83	1	0	84	7	1	12	20
11	%	50.0	50.0	00.0		80.0	00.0	20.0		100.0	00.0	00.0		72.7	9.1	18.2	
	N	1	1	0	2	28	0	7	35	86	0	0	86	8	1	2	11
12	%	100.0	00.0	00.0		79.4	5.9	14.7		100.0	00.0	00.0		63.6	9.1	27.3	
	N	2	0	0	2	27	2	5	34	69	0	0	69	7	1	3	11
Total	%	39.1	21.8	39.1		66.4	5.5	28.1		98.3	.5	1.2		35.0	7.2	57.8	
	N	77	43	77	197	688	57	291	1036	1019	5	13	1037	107	22	177	306

TABLE 6-f

PRE-SCHOOL LANGUAGE PERCENTAGES BY AREAS, GRADES, AND RACE-SCHOOL GROUPS

ANADARKO

Grade		Indian Pupils in Federal Schools			Total	Indian Pupils in Public Schools			Total	White Pupils in Public Schools			Total
		E	O	C		E	O	C		E	O	C	
4	%	56.8	2.3	40.9		64.7	00.0	35.3		99.2	00.0	0.8	
	N	25	1	18	44	22	0	12	34	131	0	1	132
5	%	85.7	00.0	14.3		43.9	00.0	56.1		98.7	00.0	1.3	
	N	42	0	7	49	18	0	23	41	148	0	2	150
6	%	75.0	6.8	18.2		65.4	00.0	34.6		99.2	0.8	00.0	
	N	33	3	8	44	17	0	9	26	118	1	0	119
7	%	40.0	21.9	38.1		33.3	00.0	66.7		100.0	00.0	00.0	
	N	42	23	40	105	12	0	24	36	114	0	0	114
8	%	32.3	19.4	48.4		48.6	00.0	51.4		97.6	00.0	2.4	
	N	40	24	60	124	17	0	18	35	163	0	4	167
9	%	38.7	14.4	46.8		74.4	00.0	25.6		98.8	00.0	1.2	
	N	86	32	104	222	29	0	10	39	168	0	2	170
10	%	43.3	13.1	43.6		60.0	00.0	40.0		97.4	00.0	2.6	
	N	136	41	137	314	12	0	8	20	148	0	4	152
11	%	51.8	10.3	37.9		24.0	00.0	76.0		96.8	00.0	3.2	
	N	131	26	96	253	6	0	19	25	153	0	5	158
12	%	51.2	15.7	33.2		62.5	00.0	37.5		98.4	00.0	1.6	
	N	111	34	72	217	10	0	6	16	121	0	2	123
Total	%	47.1	13.4	39.5		52.6	00.0	47.4		98.4	0.1	1.6	
	N	646	184	542	1372	143	0	129	272	1264	1	20	1285

PRE-SCHOOL LANGUAGE PERCENTAGES BY AREAS, GRADES, AND RACE-SCHOOL GROUPS

MUSKOGEE

Grade		Indian Pupils in Federal Schools				Indian Pupils in Public Schools				White Pupils in Public Schools			
		E	O	C	Total	E	O	C	Total	E	O	C	Total
4	%	14.5	29.1	56.4		27.3	9.1	63.6		98.8	00.0	1.2	
	N	16	32	62	110	18	6	42	66	165	0	2	167
5	%	27.2	28.4	44.4		46.8	10.1	43.0		99.5	00.0	0.5	
	N	22	23	36	81	37	8	34	79	192	0	1	193
6	%	22.0	38.0	40.0		43.0	7.0	50.0		97.9	00.0	2.1	
	N	22	38	40	100	37	6	43	86	90	0	4	194
7	%	20.4	38.0	41.7		45.6	12.7	41.8		99.5	00.0	0.5	
	N	22	41	45	108	36	10	33	79	194	0	1	195
8	%	35.5	30.4	34.3		45.7	14.3	40.0		98.1	00.0	1.9	
	N	36	31	35	102	32	10	28	70	206	0	4	210
9	%	28.4	31.9	39.7		45.3	16.0	38.7		98.5	0.6	0.9	
	N	33	37	46	116	48	17	41	106	332	2	3	337
10	%	34.0	24.5	41.5		57.4	8.5	34.0		97.6	00.0	2.4	
	N	18	13	22	53	27	4	16	47	243	0	6	249
11	%	26.7	10.0	63.3		48.8	9.8	41.5		97.9	00.0	2.1	
	N	8	3	19	30	20	4	17	41	186	0	4	190
12	%	35.5	19.4	45.2		72.7	9.1	18.2		99.0	00.0	1.0	
	N	11	6	14	31	16	2	4	22	199	0	2	201
Total	%	25.7	30.6	43.6		45.5	11.2	43.3		98.4	0.1	1.5	
	N	188	224	319	731	271	67	258	596	1807	2	27	1836

homes.[1] It must be remembered that the influence of the home and community on the child does not cease when he enters school. If he returns each evening to a home in which English is not spoken he will get no help and scant encouragement there in developing English skills. Up until grade four, for example, all pupils are developing verbal and numerical skills which are very basic to their everyday needs and common experiences. In the higher grades, however, the learning experiences involve concepts which are more abstract and farther removed from the everyday needs of the learner as he feels them. If the home, or the community for that matter, is not able to keep pace with these expanding learning situations in the school, it can contribute little to the learning process.

Defining "Acculturation." We often use the term "acculturation" as if its meaning must be clear to anyone hearing it. This certainly is taking too much for granted. There is an obligation to define "acculturation" as it applies to pupils in this study. A dictionary definition of acculturation is, "the process and result of adopting the culture traits of another group." Without presuming to treat the subject exhaustively, it may be helpful to cite some examples of traits which are felt to be characteristic of the major part of the population of the United States and which the lower achieving groups in this study probably possess in lesser degree than do the higher achieving groups.

1. Habitual use of spoken and written English in the home and community as a means of communication. The presence of books, magazines, a daily newspaper, radio, and perhaps television in the home.

2. Regular, useful, and gainful employment of the bread-winner of the family. The possibility of the children of the family looking toward adulthood with confident expectation of desirable employment opportunity.

3. Participation with one's neighbors in the educational agencies of the community, other than schools, such as the churches, Scouting, and 4-H clubs.

4. Participation by adult members of the family in civic and community affairs such as voting, active membership in service clubs, veterans organizations, farmers cooperatives, etc., to mention only a few.

5. A reasonably good understanding of and concern for proper diet and health practices, particularly as they concern the younger members of the family.

6. Acceptance of a set of values which attaches importance to such traits as industry, thrift, punctuality, acquisitiveness, competitiveness, and independence. (Whether all of these traits are virtuous, especially when carried to an extreme, may be debatable. It is felt that they **are typical** of the major culture of the country.)

How Acculturation Is Accomplished. It must be obvious that the above list could be expanded, almost **ad infinitum.** It is clear, however, that even the six points listed are not solely within the immediate control of the school. The writers would be the first to place the school at the head of a list of acculturative agencies of society. The benefits of education, however, find their most effective expression in home and community life. Usually it is only after the pupil himself has reached adulthood and becomes the head of a family that his education makes itself felt in changing culture patterns. Thus, generation by generation the process of acculturation progresses. This "delayed action" type of progress is frustrating to those persons who impatiently expect people to be "made over in a day" and who seem to believe that if the schools are run effectively this should be possible.

Furthermore, however well the schools may do their job, the task of helping Indian people to achieve full status in American life calls for cooperative effort on a broad front. It is neither the prerogative nor the desire of the writers to lecture the Indian people concerning any obligation on their part to acquire the traits of the dominant culture. The writers feel they should point out, however, that Indian people face an alternative—perhaps a hard one. For except as Indian people embrace the major culture it seems unlikely that their children, on the average, will learn as well or as much in their school subjects as do white children. Nor is the problem unilateral in its aspects. Non-Indian people cannot reasonably expect that Indian people will enthusiastically embrace the major culture unless they are encouraged and helped to do so.

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[1] The Effect of Pre-School Language on the Educational Achievement of Indian and White Children in the Southwestern United States, a progress report submitted by the University of Kansas to the Bureau of Indian Affairs, January 1954.

Reconciling Two Exceptions to the General Hierarchy of Achievement

How can the two exceptions to the general hierarchy of achievement of race-school groups be explained: namely, the relatively high position of mission school pupils in the Aberdeen Area and of Federal school pupils in the Albuquerque Area? So far as the Aberdeen Area is concerned, the fact that mission school pupils achieved at a higher level than Federal school pupils, and at least as high as public school Indian pupils, is perfectly consistent with the main premise set forth in this chapter thus far. That is, the mission schools in the Aberdeen Area enrolled a smaller percentage of full-blood Indian pupils than did either the Federal or public schools. Furthermore, a larger percentage of mission school Indian pupils spoke only English prior to school entrance, and a smaller percentage spoke only another tongue, than was true of either Federal or public school Indian pupils.

The relatively high achievement of the Federal school pupils in the Albuquerque Area does not yield to such a ready explanation. Here the Indian pupils in Federal schools achieved significantly higher than did the Indian pupils in public schools. Also, there was no significant difference between the level of achievement of public school Indian pupils and those in mission schools. No objective data can be adduced to account satisfactorily for this departure from the typical hierarchy as described in Chapter IV. A substantially higher percentage of the Federal school pupils were full-bloods than was true for the public school pupils. The mission schools enrolled a higher percentage of full-blood pupils than did either of the other types of schools. Also, a much lower percentage of public school Indian pupils spoke only some language other than English, prior to school entrance, than was true of either Federal or mission school Indian pupils.

Without question the Federal schools of the Albuquerque Area (now the United Pueblos Agency) enjoy certain advantages not shared by those of some of the other areas. First, the Pueblo villages were fairly compactly located with respect to area headquarters, facilitating effective supervision of the schools. The education staff of the Bureau has taken full advantage of this circumstance to do excellent work in the supervision of instruction, cooperative curriculum planning and preparation of teaching materials, and in evaluation of the educational program. Second, the Pueblo people live in villages, immediately adjacent to which the Federal day schools have been placed. The Pueblo people have had for centuries a relatively stable culture and a closely knit community organization. As a result the day schools have become closely integrated with village community life. One result of this has been that the average daily attendance of the Federal day schools approaches a highly satisfactory 94 percent, as disclosed by attendance records independent of this study.

It may be important to note that the non-Indian pupils in the public schools of the Albuquerque Area differ markedly in one respect from any other non-Indian group in this study. Twenty-eight percent of them spoke only some language other than English before starting to school (mostly Spanish) and 37.3 percent spoke a combination of English and some other language. Only 34.8 percent spoke only English prior to school entrance. They were the lowest achieving of all the non-Indian public school groups in the study, although they achieved significantly higher than any of the Indian groups in the Albuquerque Area. One can only speculate as to whether they exercised less acculturative influence on their Indian classmates in the public schools than did their non-Indian contemporaries in the other areas.

AGE OF PUPILS IN RELATION TO GRADE

On the average, Indian children are older for their grade than are white pupils. Age-grade data in this study reveal that, in general, the average age of Indian pupils in Federal schools was slightly more than a year greater than that of white children in public schools in the same grade. Indian pupils in public schools were approximately six months older, on the average, than their white classmates, while Indian children in mission schools were, in general, nearly a year older than white pupils of the same grade in the public schools. These findings are very similar to those of Peterson[2] in 1946 and of Anderson,[3] et al, in 1950.

Tables 6-h through 6-m show the distribution of pupils in the study by age and by grade for each of the six areas. Pupils falling within the normal age range for a grade are set off by the staggered lines. The determination of what is "normal" age for a grade was based mainly on the data themselves. Ages nine and ten included more fourth-graders (the lowest grade in the study) than did any other two successive ages. Fourth-grade pupils who were either nine or ten years old at the time the tests were given were thus identified as "at grade" for their age. Those who were older or younger were identified as "over-age" or "under-age", respectively. By a regular progression, normal ages for each of the succeeding grade levels were determined by adding one year for each grade. Tables 6-h through 6-m also show a median age for each race-school group, for each grade in each area.

The average over-ageness of Indian pupils as compared with white pupils was not the same in all of the areas. For Indian pupils in Federal schools it was greatest in the Phoenix and Muskogee Areas and least in the Albuquerque Area, ranging from about one year and four months for the former to about eleven months for the latter. For Indian pupils in public schools it was greatest in the Aberdeen Area and least in the Anadarko Area, with a range from approximately nine months to about four months. The greatest over-ageness for Indian pupils in mission schools occurred in the Phoenix Area and the least in the Aberdeen and Albuquerque Areas, ranging from about one and a half years to about nine months.

Some Reasons for the Over-ageness of Indian Pupils

It should be remembered that late entrance into school accounts for some, but by no means all of the over-ageness of Indian pupils. For those pupils who speak little or no English prior to school entrance, Federal schools have found it necessary to require a beginning year. During this year skills in spoken English are developed and the child is helped to acquire a background of experience which will make formal instruction in the basic skill subjects, beginning with grade one, more meaningful to him. Presumably public and mission schools which enroll children with a similar problem must do much the same things. Undoubtedly the necessity for this beginning year contributes substantially to the general over-ageness of Indian pupils.

Another factor which may account in part for the tendency of Indian pupils to be older for their grade than white children of the same grade is the frequency with which Indian children in some localities fail to attend school during an entire school year. Lack of stability in the social and economic life of many Indian families mainly accounts for this. For example, in some localities some families withdraw children from school for considerable periods of time while the adults, and the older children, engage in migrant seasonal labor. The families need the income from this type of work because of poor resources on the reservations, but prolonged periods of absence from school may, of course, necessitate a pupil's repeating a grade. School authorities are striving hard to correct this situation by

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[2] Shailer Peterson. 1948. **How Well Are Indian Children Educated?** Haskell Institute Press.

[3] Kenneth E. Anderson, E. Gordon Collister and Carl E. Ladd. 1953. **The Educational Achievement of Indian Children.** Haskell Institute Press.

TABLE 6-h

AGE-GRADE DISTRIBUTIONS, PHOENIX AREA, 1951

INDIAN CHILDREN IN FEDERAL SCHOOLS

	GRADE								
AGE	4	5	6	7	8	9	10	11	12
21	1								1
20	0						3	2	6
19	0			2			7	3	8
18	1	2		1	3	2	15	16	12
17	1	0	1	6	14	10	24	20	3
16	2	1	4	17	24	24	33	11	1
15	3	6	11	37	47	19	7	3	
14	3	10	17	52	41	3	2		
13	11	21	49	56	18				
12	26	47	50	11	1				
11	62	72	19	1					
10	69	25	3						
9	11	1							
8	—	—	—	—	—	—	—	—	—
Total	190	185	154	183	148	58	91	55	31
Median Age	11.2	11.9	13.1	14.5	15.3	16.3	17.2	17.7	19.0

INDIAN CHILDREN IN PUBLIC SCHOOLS

	GRADE								
AGE	4	5	6	7	8	9	10	11	12
21									
20									1
19									0
18								4	2
17						1	2	2	1
16		1			1	1	4	3	
15		0	2	1	3	9	6		
14		1	4	4	5	7	1		
13	1	4	7	7	6	1			
12	3	7	17	4	2				
11	7	9	10						
10	15	11							
9	13	1							
8	6	—	—	—	—	—	—	—	—
Total	45	34	40	16	17	19	13	9	4
Median Age	10.3	11.6	12.6	13.6	14.1	15.2	15.9	17.8	18.5

TABLE 6-h (continued)

WHITE CHILDREN IN PUBLIC SCHOOLS

	GRADE								
AGE	4	5	6	7	8	9	10	11	12
21									
20									
19								1	1
18						1		2	2
17						2	5	7	8
16					1	5	8	16	4
15			6	1	7	12	16	4	
14		1	4	3	12	16	5		
13	1	2	6	12	23	8			
12	3	9	16	16	7				
11	8	14	21	9					
10	18	31	9						
9	39	13							
8	9								
Total	78	70	62	41	50	44	34	30	15
Median Age	9.7	10.7	12.1	12.8	13.8	14.9	15.8	16.7	17.4

INDIAN CHILDREN IN MISSION SCHOOLS

	GRADE								
AGE	4	5	6	7	8	9	10	11	12
21									1
20					1			1	0
19					0	1	2	3	4
18					4	3	2	5	3
17			1	2	11	6	7	4	3
16			3	10	17	11	10	2	2
15		1	3	10	19	14	1		
14	2	3	25	16	10	10			
13	3	8	17	16	3				
12	5	20	19	7					
11	25	20	10						
10	19	4							
9	11								
8									
Total	65	56	78	61	65	45	22	15	13
Median Age	11.1	12.2	13.6	14.5	16.1	15.9	17.0	18.4	18.5

TABLE 6-1

AGE-GRADE DISTRIBUTIONS, ALBUQUERQUE AREA, 1951

INDIAN CHILDREN IN FEDERAL SCHOOLS

AGE	GRADE 4	5	6	7	8	9	10	11	12
21							1	1	2
20							1	2	4
19						2	8	32	32
18					1	6	14	38	26
17			1	6	8	26	38	41	14
16		1	4	16	37	72	75	16	1
15	2	4	12	45	77	85	19	2	
14	5	16	38	86	76	29			
13	8	40	98	55	30	3			
12	28	82	92	41	5				
11	116	101	47	2					
10	124	36	7	2					
9	53	1							
8	6	—	—	—	—	—	—	—	—
Total	342	281	299	253	234	223	156	132	79
Median Age	10.9	12.0	13.0	14.3	15.1	15.9	16.8	18.2	18.9

INDIAN CHILDREN IN PUBLIC SCHOOLS

AGE	GRADE 4	5	6	7	8	9	10	11	12
20									1
19							1	2	6
18							1	3	5
17							1	10	4
16				2	1	15	7	3	
15			1	7	11	18	8	1	
14			0	15	20	11	1		
13	3	1	5	26	13				
12	1	5	6	14	1				
11	4	4	10						
10	5	2							
9	2								
8	—	—	—	—	—	—	—	—	—
Total	15	12	22	64	46	44	19	19	16
Median Age	11.1	12.0	12.1	13.6	14.5	15.6	16.1	17.6	18.8

TABLE 6-i (continued)

WHITE CHILDREN IN PUBLIC SCHOOLS

	GRADE								
AGE	4	5	6	7	8	9	10	11	12
20									1
19						1		2	4
18					2	1	2	5	35
17					5	13	10	36	41
16		1		3	18	66	37	29	10
15		0	4	14	47	127	43	6	1
14	1	6	14	34	98	114	14	1	
13	4	20	43	105	124	24			
12	16	44	91	116	21	1			
11	42	81	93	29	1				
10	93	74	20						
9	121	10							
8	26								
Total	303	236	265	301	316	347	106	79	92
Median Age	10.1	11.4	12.2	13.1	14.1	15.3	15.9	17.1	17.9

INDIAN CHILDREN IN MISSION SCHOOLS

	GRADE								
AGE	4	5	6	7	8	9	10	11	12
19								3	10
18					2	2	1	3	25
17			2	1	3	5	19	14	6
16		1	2	2	14	14	24	13	2
15		1	4	16	18	18	16	1	
14	2	8	14	23	30	23	4		
13	2	10	17	30	20	2	1		
12	12	14	14	17	4				
11	12	10	7	2					
10	15	5	1						
9	5								
Total	48	49	61	91	91	64	65	34	43
Median Age	11.3	12.7	13.5	13.9	14.7	15.4	16.5	17.2	18.5

TABLE 6-j

AGE-GRADE DISTRIBUTIONS, ABERDEEN AREA, 1952

INDIAN CHILDREN IN FEDERAL SCHOOLS

				GRADE					
AGE	4	5	6	7	8	9	10	11	12
									1
24									2
23									1
22								1	1
21								1	8
20							1	14	27
19						1	1	30	54
18					1	4	14	60	47
17		1	1	5	10	32	54	53	10
16		5	8	17	44	60	95	8	
15	4	11	12	56	105	117	62		
14	6	20	71	109	138	68	9		
13	32	58	113	129	80	13			
12	52	124	146	90	13				
11	103	151	85	18					
10	151	90	23						
9	135	15							
8	20								
Total	503	475	459	424	391	295	236	167	151
Median Age	10.6	11.9	12.8	13.8	14.7	15.6	16.5	17.4	18.3

INDIAN CHILDREN IN PUBLIC SCHOOLS

				GRADE					
AGE	4	5	6	7	8	9	10	11	12
20									
19							1	6	9
18					1		3	5	11
17		1			0	6	27	24	21
16		0	1		3	11	30	17	1
15		1	2	7	12	20	22	3	
14	1	4	6	14	21	24	2		
13	7	16	18	28	28				
12	6	17	39	39	4				
11	15	32	34	7					
10	24	28	5						
9	57	5							
8	1								
Total	111	104	105	95	69	61	85	55	42
Median Age	10.0	11.6	12.4	13.1	14.1	15.3	16.6	17.1	18.0

TABLE 6-j (continued)

WHITE CHILDREN IN PUBLIC SCHOOLS

AGE	GRADE 4	5	6	7	8	9	10	11	12
23									
22									
21									
20									1
19							1		4
18							2	5	40
17						3	14	46	154
16				1	2	14	43	164	50
15				5	16	49	192	45	3
14		2		13	32	188	61	1	
13	2	0	18	46	164	46			
12	1	11	29	176	50	2			
11	8	45	194	49					
10	34	224	37						
9	220	34							
8	33	—	—	—	—	—	—	—	—
Total	298	316	278	290	264	302	313	261	252
Median Age	9.5	10.6	11.5	12.6	13.5	14.6	15.5	16.5	17.5

INDIAN CHILDREN IN MISSION SCHOOLS

AGE	GRADE 4	5	6	7	8	9	10	11	12
21							1	2	
20							0	0	3
19						1	1	1	4
18			1			0	4	8	13
17			0	1	1	6	12	18	12
16			0	3	1	7	24	14	8
15	2		0	11	16	43	17	6	
14	1	7	5	30	28	28	7		
13	4	9	32	40	52	10			
12	14	26	52	35	4	1			
11	23	51	48	6					
10	46	50	3	1					
9	53	5							
8	4	—	—	—	—	—	—	—	—
Total	147	148	141	127	102	96	66	49	40
Median Age	10.5	11.4	12.4	13.5	13.9	15.2	16.4	17.3	18.0

TABLE 6-k

AGE-GRADE DISTRIBUTIONS, BILLINGS AREA, 1953

INDIAN CHILDREN IN FEDERAL SCHOOLS

AGE	GRADE 4	5	6	7	8	9	10	11	
21									
20									
19								1	
18						1		0	2
17					1	3	3	1	
16				1	1	2	1		
15			1	5	2	2	3		
14		1	2	9	6	2			
13		3	8	11	3	1			
12	3	9	16	1					
11	12	25	6						
10	24	15							
9	7	3							
8	1	—	—	—	—	—	—	—	—
Total	47	56	33	27	13	11	7	2	2
Median Age	10.7	11.4	12.7	14.2	14.6	16.3	16.5	18.5	18.5

INDIAN CHILDREN IN PUBLIC SCHOOLS

AGE	GRADE 4	5	6	7	8	9	10	11	12
21									1
20									1
19					1			1	8
18					0	1	3	7	12
17		1			1	3	6	13	12
16		1		6	2	9	13	14	
15		0	3	15	32	34	26		
14	1	1	12	36	36	19	3		
13	3	5	27	70	50	4			
12	7	26	42	63	5				
11	26	69	58	7					
10	72	54	5						
9	80	12							
8	10	—	—	—	—	—	—	—	—
Total	199	169	147	197	127	70	51	35	34
Median Age	10.1	11.3	12.3	13.4	14.2	15.4	15.4	15.9	18.4

TABLE 6-k (continued)

WHITE CHILDREN IN PUBLIC SCHOOLS

AGE	GRADE 4	5	6	7	8	9	10	11	12
21									
20									
19								1	1
18							1	2	15
17							8	7	43
16					1	3	15	64	8
15				1	3	14	49	12	2
14		1	1	2	25	56	9		
13		1	4	21	60	9			
12		3	29	92	17				
11	2	20	99	13					
10	21	127	14						
9	112	10							
8	13								
Total	148	162	147	129	106	82	82	86	69
Median Age	9.5	10.6	11.6	12.6	13.6	14.6	15.7	16.5	17.6

INDIAN CHILDREN IN MISSION SCHOOLS

AGE	GRADE 4	5	6	7	8	9	10	11	12
21									
20								1	
19							1	1	1
18							2	0	3
17					1	5	4	2	6
16				1	5	8	5	7	1
15		2		7	7	10	6	1	
14		1	4	6	11	10	2		
13	1	5	13	21	4				
12	2	7	21	13	1				
11	15	15	15						
10	11	21	4						
9	14								
8	1								
Total	44	51	57	48	29	33	20	12	11
Median Age	10.6	11.3	12.5	13.5	14.9	15.7	16.4	16.7	17.8

TABLE 6-1

AGE-GRADE DISTRIBUTIONS, ANADARKO AREA, 1954

INDIAN CHILDREN IN FEDERAL SCHOOLS

	GRADE								
AGE	4	5	6	7	8	9	10	11	12
24							1	1	2
23							1	0	1
22							0	0	2
21							0	0	1
20							5	7	12
19						3	8	16	49
18				1		7	37	59	62
17				5	5	18	71	66	81
16			1	2	18	61	110	92	4
15		1	0	10	36	64	66	10	1
14		0	1	27	34	61	13	1	
13		4	11	34	21	7	1		
12	2	10	19	22	10	1			
11	9	18	11	5					
10	21	16							
9	16	3							
8	1	—	—	—	—	—	—	—	—
Total	49	52	43	106	124	222	313	252	215
Median Age	10.4	11.4	12.6	13.8	14.9	15.7	16.7	17.4	18.4

INDIAN CHILDREN IN PUBLIC SCHOOLS

	GRADE								
AGE	4	5	6	7	8	9	10	11	12
20									
19									
18								3	1
17						1	2	13	13
16				1	2	7	8	8	2
15				1	6	8	9		
14				2	9	19	1		
13		2	4	12	16	4			
12		3	12	16	2				
11	3	11	9	6					
10	5	24	1						
9	24	1							
8	3	—	—	—	—	—	—	—	—
Total	35	41	26	38	35	39	20	24	16
Median Age	9.6	10.8	12.3	12.8	14.0	14.8	16.0	17.3	17.5

TABLE 6-1 (continued)

WHITE CHILDREN IN PUBLIC SCHOOLS

	GRADE								
AGE	4	5	6	7	8	9	10	11	12
23									
22									
21									
20								1	2
19		1					1	0	3
18		0				1	2	6	20
17		0			2	1	7	30	77
16		1			2	8	25	102	19
15		0		1	5	26	108	17	
14		0	1	4	16	112	8	1	
13	1	0	7	17	114	22			
12	0	2	7	69	33				
11	0	10	86	24					
10	10	123	18						
9	114	14							
8	8								
Total	133	151	119	115	172	170	151	157	121
Median Age	9.5	10.5	11.5	12.5	13.5	14.6	15.6	16.6	17.5

TABLE 6-m

AGE-GRADE DISTRIBUTIONS, MUSKOGEE AREA, 1954

INDIAN CHILDREN IN FEDERAL SCHOOLS

	GRADE								
AGE	4	5	6	7	8	9	10	11	12
22									
21						1			2
20					1	2		1	4
19			1	1	0	3	3	1	6
18			0	2	6	8	7	8	8
17			1	5	11	20	18	13	9
16			1	9	18	24	15	5	2
15	1	3	8	24	23	32	8	1	
14	5	10	17	26	24	22	1	1	
13	6	7	23	23	17	4			
12	17	20	23	20	1	1			
11	21	24	24						
10	47	18	6						
9	16	1							
8	1								
Total	114	83	105	110	101	117	52	30	31
Median Age	10.9	11.9	13.0	14.5	15.4	15.7	17.1	17.6	18.6

INDIAN CHILDREN IN PUBLIC SCHOOLS

	GRADE								
AGE	4	5	6	7	8	9	10	11	12
21									
20						1		1	1
19						0	2	3	6
18					1	3	0	2	5
17		1			6	9	9	14	8
16		0	2	4	3	18	12	15	3
15		1	3	7	7	26	20	5	
14	1	2	5	15	21	39	4		
13	3	5	15	24	26	10			
12	7	12	22	23	6				
11	12	17	38	6					
10	16	41	2						
9	30	2							
8									
Total	69	81	87	79	70	106	47	40	23
Median Age	10.3	10.9	12.2	13.4	14.1	15.2	16.0	17.0	18.1

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TABLE 6-m (continued)

WHITE CHILDREN IN PUBLIC SCHOOLS

	GRADE								
AGE	4	5	6	7	8	9	10	11	12
29									1
28									0
27									0
26									1
25									0
24									0
23									0
22									0
21									2
20									1
19							2	2	8
18							2	6	44
17			1	1	2	2	14	46	107
16			1	4	3	25	60	108	35
15			0	7	9	64	138	27	2
14		2	2	16	42	202	32	1	
13		4	11	35	128	47	1		
12		7	32	106	27				
11	7	34	128	24					
10	27	137	20						
9	120	12							
8	14								
Total	168	196	195	193	211	340	249	190	201
Median Age	9.6	10.6	11.6	12.7	13.6	14.6	15.7	16.6	17.6

finding means of keeping the children in school while the adults are away from home working.

It is not believed that there is any widespread practice, in Federal schools at least, of retaining a pupil in a grade for a second year because of academic failure. The writers cannot speak with authority concerning the promotional policies of public and mission schools.

Other Observations

Referring again to Tables 6-h through 6-m, it will be noted that in general the range of ages in a given grade was greatest for Indian pupils in Federal schools and least for white pupils in public school. It will be observed, too, that generally the range of ages within a grade lessened for each race-school group from grade four through grade twelve. The writers believe that this latter phenomenon is brought about largely by the dropping out of school of over-age pupils as the higher grades are reached.

For the most part, in any grade in any area the concentration of ages for white pupils in public schools was in one or two years, while the concentration of Indian pupils in Federal schools was usually in three or four different years.

Although no data relating to the sex of pupils is given in the age-grade tables, it was observed by the investigators that, regardless of race-school groupings, the preponderance of pupils who were over-age for their grade were boys and the majority of pupils who were under-age for their grade were girls.

It appears from the data that, except in the Albuquerque and Phoenix Areas, Indian and white pupils tend to be more nearly the same age in the eleventh and twelfth grades than was true for the earlier grades. Again, we find here a suggestion of heavy drop-out of over-age Indian pupils at the highest grade levels.

The Relationship Between Age in Grade and Achievement

A study of the data reveals, furthermore, that there is a definite relationship between the over-ageness or under-ageness of the pupils in this study and their achievement in the basic skill subjects. There is impressive evidence that, on the average, those pupils who were over-age for their grade did not make as high scores on the tests as did the pupils who were of normal age for their grade. The data indicate, somewhat less conclusively, that in general the pupils who were under-age for their grade did somewhat better on the tests than did those falling within the normal age range. A word of explanation and of qualification about this latter statement is necessary and will be given later.

A comparison of the achievement of at-age, over-age, and under-age pupils, on total score only, was made for each area, in each grade, and for each race-school group whenever the number of pupils in a category was large enough to insure a reasonable degree of reliability. No comparison was made when the number of pupils in a category fell below thirty. Table 6-n shows the results of these comparisons. It will be noted that the table shows the differences between mean scores for various pairs of age groups. The mean score of the second group has been subtracted from the mean score of the first group.

In all it was possible to make sixty-eight comparisons. Of these, fifty-one were comparisons of over-age pupils with those who were at-grade for their age. Of the fifty-one comparisons, forty-three showed that pupils who were of normal age for their grade achieved significantly higher on the average than did those who were over-age. In only one instance (tenth grade in Federal schools of the Albuquerque Area) did over-age pupils actually make a higher average score than pupils who were at-grade for their age.

TABLE 6-n

A COMPARISON OF ACHIEVEMENT (TOTAL SCORE) OF "AT-AGE," "OVER-AGE," AND "UNDER-AGE" PUPILS, BY AREAS, GRADES, AND RACE-SCHOOL GROUPS

ALBUQUERQUE AREA

Grade	Race-School	Age-Groups	Differences Between Means
4	FI	AA-OA	7.7*
	PW	AA-OA	10.5*
5	FI	AA-OA	18.2*
	PW	AA-OA	23.6*
6	FI	AA-OA	23.8*
	PW	AA-OA	28.4*
7	FI	AA-OA	9.9*
	PW	UA-AA	9.8
		UA-OA	39.1*
		AA-OA	29.3*
8	FI	AA-OA	23.7*
	PW	AA-OA	52.5*
9	FI	AA-OA	12.2*
	PW	UA-AA	-.6
		UA-OA	37.3*
		AA-OA	38.0*
10	FI	AA-OA	-.4
12	FI	AA-OA	12.0

BILLINGS AREA

Grade	Race-School	Age-Groups	Differences Between Means
4	PI	AA-OA	7.9
5	PI	AA-OA	15.4*
6	PI	AA-OA	20.5*
7	PI	AA-OA	28.2*
8	PI	AA-OA	31.1*

ANADARKO AREA

Grade	Race-School	Age-Groups	Differences Between Means
7	FI	AA-OA	20.0*
8	FI	AA-OA	7.2
	PW	UA-AA	7.5
9	FI	AA-OA	23.8*
10	FI	AA-OA	16.7*
11	FI	AA-OA	27.6*
12	FI	AA-OA	29.2*

Differences between means are of total raw score and were obtained by subtracting the mean of the second group from the mean of the first. All differences except those preceded by a minus sign indicate that the first group in the comparison had the higher average or mean score.

*Significant at or beyond the .05 level of confidence. (Apparent inconsistencies, in that some differences are not significant whereas smaller differences are, are attributable to the smaller number of pupils in a group. For these numbers refer to Tables 6-h through 6-m.)

TABLE 6-n (continued)

ABERDEEN AREA

Grade	Race-School	Age Groups	Differences Between Means
4	FI	AA-OA	6.2*
	MI	AA-OA	8.4
	PW	UA-AA	-10.2
5	FI	AA-OA	14.6*
	PI	AA-OA	30.2*
	MI	AA-OA	7.0
	PW	UA-AA	3.7
6	FI	AA-OA	19.6*
	MI	AA-OA	5.3
	PW	UA-AA	3.9
7	FI	AA-OA	18.7*
	MI	AA-OA	18.4*
	PW	UA-AA	4.1
8	FI	AA-OA	25.5*
	PW	UA-AA	2.9
9	FI	AA-OA	25.7*
	PW	UA-AA	15.9*
10	FI	AA-OA	26.0*
	PI	AA-OA	39.0*
	PW	UA-AA	18.4*
11	FI	AA-OA	26.4*
	PW	UA-AA	16.5*
12	FI	AA-OA	21.1*
	PW	UA-AA	23.8*

PHOENIX AREA

Grade	Race-School	Age Groups	Differences Between Means
4	FI	AA-OA	10.7*
	MI	AA-OA	8.2
5	FI	AA-OA	20.3*
6	FI	AA-OA	15.1*
7	FI	AA-OA	25.6*
8	FI	AA-OA	20.2*
10	FI	AA-OA	23.1*

MUSKOGEE AREA

Grade	Race-School	Age Groups	Differences Between Means
4	FI	AA-OA	24.2*
7	FI	AA-OA	34.5*
8	FI	AA-OA	26.3*
9	FI	AA-OA	31.4*
	PW	UA-AA	18.0*
10	PW	UA-AA	18.1
12	PW	UA-AA	27.7*

Of the remaining seventeen comparisons, fifteen compared the achievement of under-age pupils with those of normal age. Of these, six showed the under-age pupils to be significantly higher. In only two of the fifteen comparisons did the at-age pupils actually make higher average scores than those who were under-age.

The remaining two comparisons were of under age and over-age pupils. In both of these the under-age pupils were significantly higher.

Except in the Albuquerque Area, all of the over-age comparisons were of Indian children. Without exception the under age comparisons were of white pupils.

It must be noted that most of the pupils who are here classified as "under-age" would not be considered so in many, or perhaps most, of the schools of the nation. The normal age-grade range as defined in this study is perhaps one year higher than in the typical school. Therefore, there is no justification whatever for concluding that starting children to school at an unusually early age or accelerating them unduly helps them to learn.

The writers do not believe that over-ageness in itself is the sole contributor to the tendency of over-age pupils to achieve less well than those of normal age. It is probable that social, economic, and cultural factors in the home and community which may have caused the pupil to be over-age in the first place will continue to operate against his learning. It is true, however, that being over-age for his grade may hamper a pupil's social adjustment in the school and cause serious loss of interest and motivation.

Once again, the reader should bear in mind that we have been speaking in terms of averages. There were, of course, some over-age pupils who achieved higher than some pupils who were of normal age for their grade.

The "Holding Power" of the School

One of the perennial concerns of the school is its "holding power." However effective or ineffective the program of the school may be in educating the child, it obviously can do nothing for him if he is not present. It therefore behooves any school to examine its "drop-out" problem closely—to see whether it is alarmingly high and to determine, if it can, why children drop out of school prior to completion of the twelfth grade. Incidentally, it is often very difficult to determine the true reasons for a pupil's dropping out of school. Inevitably, since Indian children attend three different types of schools, there is considerable interest as to which type does the best job of holding Indian children in school.

Unfortunately the data in this study are not of such a nature as to throw much light on this question. There are several reasons for this:

(a) The data were all gathered in a given year for a given area and thus do not represent the progression of the same children from grade four toward or through grade twelve.

(b) The increasing influx of students into the lower grades, typical of the country as a whole in recent years, is not taken into account.

(c) In organizing the study, there was no attempt to control closely the selection of participating schools with the drop-out question in mind. To have done so would have seriously handicapped the study in other important respects. The general aim was to test all children in Federal schools in an area and approximately the same number of pupils in public and mission schools combined. Public schools enrolling a considerable proportion of Indian pupils, and operating in the same general localities as Federal schools, were invited to participate. Participation was entirely voluntary, however, and depended largely upon the interest of public school administrators and teachers.

Examples of unusual enrollment situations which resulted were:

(1) In many communities public high school pupils are bussed in from smaller rural communities which operate their own elementary schools and which may not have participated in the study. This served to make the high school enrollment larger by comparison with elementary enrollment than it would normally be. The Aberdeen, Muskogee, and Anadarko Areas offer excellent illustrations of this. On the other hand, an opposite situation might exist: the elementary school may have participated in the program whereas the high school in another community to which the pupils are bussed did not.

(2) Indian children often transfer from Federal day schools or public schools to Federal boarding schools, sometimes in a different area. For instance, Flandreau, in the Aberdeen Area, enrolls pupils from the Billings Area; Chilocco and Haskell, while administratively in the Anadarko Area, enroll many pupils from the Muskogee Area.

(3) There is always some transferring of pupils among public, mission, and Federal schools at all grade levels.

Nevertheless, with due regard for the limitations mentioned above, there are indications from the data that Indian children the country over are not staying in school to the completion of their high school education in as large proportions as do white children. The data shown below seem to support this conclusion.

In 1950 there were 49.8 percent as many twelfth-graders as fourth-graders for the country as a whole and 77.7 percent as many twelfth-graders as eighth-grade pupils. These percentages for the Indian population in this study are well below that. They are shown in Table 6-o, below.

Table 6-o

A PERCENTAGE COMPARISON OF THE NUMBER OF PUPILS IN GRADE 12 OF THIS STUDY WITH GRADES 4 AND 8. TOTAL POPULATION—
(SIX AREAS COMBINED)

Indian Pupils in Federal Schools
41.1 percent as many in Gr. 12 as in Gr. 4
49.4 percent as many in Gr. 12 as in Gr. 8

Indian Pupils in Mission Schools
26.1 percent as many in Gr. 12 as in Gr. 4
30.2 percent as many in Gr. 12 as in Gr. 8

Indian Pupils in Public Schools
28.1 percent as many in Gr. 12 as in Gr. 4
37.1 percent as many in Gr. 12 as in Gr. 8

White Pupils in Public Schools
66.4 percent as many in Gr. 12 as in Gr. 4
67.3 percent as many in Gr. 12 as in Gr. 8

Unquestionably the "holding power" of the school for Indian pupils is a matter of severe educational concern. A need for a much more rigorous and exhaustive survey of this problem is indicated.

RESIDENCE ON OR OFF A RESERVATION

There is strong evidence that Indian pupils who live on a reservation do not achieve as well in the basic skills, on the average, as those who do not. This comparison was made on total score only, by areas, by grades, and by race-school types. Again, for reasons of reliability no comparison was made when the number of pupils in any category fell below thirty. As a result, no comparisons were possible in the Albuquerque, Billings, and Phoenix Areas for the reason that there were not enough pupils whose homes were off Indian reservations. Comparisons which could be made in the Aberdeen, Anadarko, and Muskogee Areas are shown in Table 6-p.

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[4] Statistical Abstract of the United States, Bureau of the Census, 1950.

In all, twenty-two comparisons were possible. Ten of these were in the Aberdeen Area with six each in the Anadarko and Muskogee Areas. All but three of the twenty-two comparisons wete of Indian pupils in Federal schools; two were of Indian pupils in public schools and the remaining one was of Indian pupils in mission schools.

Only four of the separate comparisons revealed differences which were statistically significant. All four of these showed Indian pupils living **off** reservations to be higher. This evidence taken alone would not be very conclusive. However, it was observed that in only four of the twenty-two comparisons did Indian pupils living **on** a reservation actually make a higher average score than those living **off**. This was true for two of six comparisons in the Anadarko Area and for two of six in the Muskogee Area. In the Aberdeen Area the "off-reservation" groups were unvaryingly higher. How likely is it that the apparent superiority of the "off-reservation" group occurred by chance alone? Statistical investigation[5] revealed that this probability was less than one in two hundred, either for the three areas combined or for each area taken separately. This finding greatly strengthens the conclusion that Indian pupils who live on reservations do not achieve as high on the average as those who do not.

Table 6-p

COMPARISON OF ACHIEVEMENT (TOTAL SCORE) BETWEEN INDIAN PUPILS LIVING **ON** A RESERVATION AND THOSE LIVING **OFF** A RESERVATION

ABERDEEN AREA

Grade	Race-School	Off Reservation N	Off Reservation Mean Score	On Reservation N	On Reservation Mean Score
4	FI	50	143	446	134
5	FI	53	172	405	165
6	FI	77	196	371	192
	PI	39	202	63	198
7	FI	68	180	336	168
	PI	35	193	59	181
	MI	30	193	93	182
8	FI	54	197	354	194
9	FI	49	242*	250	212
10	FI	33	202*	200	184

MUSKOGEE AREA

Grade	Race-School	Off Reservation N	Off Reservation Mean Score	On Reservation N	On Reservation Mean Score
4	FI	75	136(-)	39	165
5	FI	50	159(-)	30	166
6	FI	69	194	35	183
7	FI	65	176*	41	143
8	FI	58	200	31	176
9	FI	78	226*	38	188

ANADARKO AREA

Grade	Race-School	Off Reservation N	Off Reservation Mean Score	On Reservation N	On Reservation Mean Score
7	FI	52	174(-)	52	177
8	FI	52	210	65	209
9	FI	151	228(-)	68	230
10	FI	222	187	91	183
11	FI	183	206	69	198
12	FI	162	216	51	201

*Significantly higher at or beyond the .05 level of confidence

(-) Average score in favor of the on-reservation group

RESIDENCE IN A TOWN OR IN THE COUNTRY

We may conclude from this study that, in general, pupils who live in a town achieve higher in the basic skill subjects than do those who live in the country.

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[5] R. A. Fisher. 1950. "Combining Tests of Significance," **Statistical Methods for Research Workers.** New York: Hafner. pp. 99-101.

Pupils in this study were asked whether they lived in a city or town or in the country. Comparisons were then made between the city-town groups and the country groups on the basis of achievement (mean total raw score). Table 6-q shows the results of these comparisons by areas, grades, and race-school groups. It also shows the number of pupils in each category.

In all, ninety-three separate comparisons were possible, after meeting the requirement of a minimum of thirty pupils in a category in the interests of reliability. Of these, seventy-six produced differences which were in the direction of the town pupils; only seventeen differences were in the direction of the country pupils. Twenty-four of the seventy-six differences favorable to the town pupils were statistically significant. Only three of the seventeen differences in the direction of the country pupils were significant.

The ninety-three comparisons were divided among the race-school groups as follows: white pupils in public schools, forty; Indian pupils in Federal schools, thirty-two; Indian pupils in public schools, fourteen; Indian pupils in mission schools, seven. Regardless of race or type of school, the evidence strongly indicates the superior achievement of pupils who live in town.

An inspection of Table 6-q will reveal that the superiority of the town dwelling pupils was not as clear-cut in the Phoenix and Albuquerque Areas as it was elsewhere. Ten of the seventeen differences favorable to country dwelling pupils occurred in these areas. We cannot be sure that the slight general tendency of town dwellers in these areas to be superior in achievement did not occur by chance. In all other areas, however, and for the study as a whole the higher average achievement of pupils living in town was highly significant.

It should be pointed out that many of the pupils living in the country attended school in town, particularly in the high school grades. It is not felt that rural day schools alone account for the differences in average achievement.

THE CHOICE OF FRIENDS BY INDIAN AND WHITE PUPILS

It has seemed to the investigators in this study that the extent to which individuals of one race, given opportunity, select their friends from among individuals of another race is a valuable indication of the stage of social integration of the two races. The choosing of friends is a very personal matter. Each of the pupils in this study was asked to check one of the following statements about his friends: 1. all of them are Indian boys and girls; 2. most of them are Indian, some are white; 3. most of them are white, some are Indian; 4. all of them are white boys and girls. To help the pupil understand what was meant by "friends," the person administering the tests suggested that friends are the persons with whom we usually play.

In treating the data, responses to items 1 and 2, above, were added together, and likewise the responses to items 3 and 4. Table 6-r shows, by areas and by grades, the percentage of pupils in each race-school group who said their friends were all or mostly Indian boys and girls and the percentage who said their friends were all or mostly white boys and girls.

It was to be expected that since the Federal and mission schools enroll few, if any, white pupils a small percentage of Indian pupils in these schools would say that their friends were all or mostly white. This proved to be true, although this percentage does run in excess of 15 percent for a few Federal and mission school groups in some of the areas. Pupils were not expected to interpret "friends" to mean only those pupils with whom they were currently attending school. Nevertheless it seems logical to suppose that most of a school child's friends will be found among his schoolmates. For this reason we can look to the percentages in the public schools with added interest. In these schools both Indian and white pupils were attending although not usually in equal proportions.

TABLE 6-q

A COMPARISON OF ACHIEVEMENT (TOTAL SCORE) IN RELATION TO TOWN OR COUNTRY RESIDENCE

PHOENIX AREA

Grade	Race-School	Differences Between Means (town minus country)	Numbers T	Numbers C
4	FI	8.9	82	106
	MI	-7.2	35	30
5	FI	17.2*	96	88
	PW	-1.6	33	36
6	FI	1.4	62	91
7	FI	10.1	146	35
8	FI	-9.5	79	68
10	FI	-7.1	43	48

ALBUQUERQUE AREA

Grade	Race-School	Differences Between Means (town minus country)	Numbers T	Numbers C
4	FI	-1.5	245	95
	PW	10.3*	196	107
5	FI	2.4	188	92
	PW	-1.3	155	80
6	FI	-13.2*	193	106
	PW	4.4	160	103
7	FI	10.3*	186	66
	PW	5.0	169	92
8	FI	17.8*	161	67
	PW	6.4	218	94
9	FI	1.3	142	78
	PW	3.3	200	128
10	FI	-19.4*	121	35
11	FI	-1.5	88	31
12	PW	-9.1	59	31

BILLINGS AREA

Grade	Race-School	Differences Between Means (town minus country)	Numbers T	Numbers C
4	PI	18.5*	110	77
	PW	14.6*	63	76
5	PI	1.9	107	60
	PW	14.4*	68	89
6	PI	4.4	80	66
	PW	4.3	58	91
7	PI	-2.9	92	88
	PW	14.0	54	69
8	PI	4.3	48	73
	PW	15.1	44	61
9	PW	3.4	37	44
10	PW	-3.7	35	83
11	PW	7.8	33	53

*Significant at or beyond the .05 level of confidence.

TABLE 6-q (continued)

ANADARKO AREA

Grade	Race-School	Differences Between Means (town minus country)	Numbers T	Numbers C
4	PW	8.0	45	72
5	PW	7.7	50	94
6	PW	-12.7	40	75
7	FI	3.4	44	58
	PW	-17.5*	38	75
8	FI	2.9	48	65
	PW	-8.9	72	82
9	FI	5.7	82	130
	PW	7.5	64	103
10	FI	5.2	163	203
	PW	5.4	182	207
11	FI	10.6	131	140
	PW	17.3*	151	187
12	FI	24.3*	120	120
	PW	14.1*	126	191

MUSKOGEE AREA

Grade	Race-School	Differences Between Means (town minus country)	Numbers T	Numbers C
4	PW	1.0	83	69
5	PW	5.9	94	93
6	PI	25.9*	34	43
	PW	13.0	76	82
7	FI	34.7*	40	66
	PI	11.4	36	40
	PW	14.5*	113	80
8	FI	9.1	35	69
	PI	13.0	38	30
	PW	12.9	134	75
9	FI	6.9	39	77
	PI	20.4	42	60
	PW	21.0*	144	185

10, 11, & 12) Combined with the Anadarko Area

ABERDEEN AREA

Grade	Race-School	Differences Between Means (town minus country)	Numbers T	Numbers C
4	FI	1.1	151	335
	PI	10.2	61	45
	MI	10.4	75	59
	PW	5.0	176	120
5	FI	4.3	131	275
	PI	23.6*	52	50
	MI	10.8	57	72
	PW	-5.3	184	121
6	FI	10.0*	135	282
	PI	24.7*	55	46
	MI	4.4	68	61
	PW	12.6*	165	94
7	FI	20.4*	119	261
	PI	6.4	63	31
	MI	6.8	44	77
	PW	8.6	174	116
8	FI	6.5	136	245
	MI	-8.8	31	65
	PW	14.5*	162	89
9	FI	23.6*	93	195
	MI	11.8	40	45
	PW	3.3	109	142
10	FI	11.8	74	150
	PI	35.4*	37	39
	PW	10.2	101	144
11	FI	20.8*	60	90
	PW	00.04	106	94
12	FI	26.0*	54	95
	PW	5.4	115	135

In the Phoenix Area the number of public school pupils was small, with the ratio of white pupils to Indian pupils in most grades running two or three to one. Still, about three-fourths of the Indian pupils said their friends were all or mostly Indian; about 90 percent of the white pupils said their friends were all or mostly white.

In the Albuquerque Area the average ratio of white pupils to Indian pupils in public schools was approximately eight to one. In spite of this, except in grades four, five, and six, more than three-fourths of the Indian pupils said that all or most of their friends were Indian. In every grade more than 90 percent of the white pupils said all or most of their friends were white. This response by the white pupils is not surprising since there were so few Indian pupils from whom they could choose their friends.

In public schools of the Aberdeen Area the ratio of white pupils to Indian pupils was between three and four to one. Here again a strong majority of the Indian pupils claimed all or mostly Indian friends while more than 95 percent of the white pupils said their friends were all or mostly white boys and girls.

Five times as many of the pupils tested in public schools of the Anadarko Area were white than were Indian. Understandably, in view of the disproportion, not more than two percent of the white pupils said that all or most of their friends were Indian. In the Anadarko Area, however, a majority of the Indian pupils in grades four, seven, ten, eleven, and twelve said that all or most of their friends were white. In the other grades the proportion of Indian pupils claiming all or mostly white friends, while less than half, was substantial.

In general there were between three and four times as many white pupils as Indian pupils tested in public schools of the Muskogee Area. As expected, more than 95 percent of the white pupils said that all or most of their friends were white. In all grades except seven and eight, however, a majority of the Indian pupils said that all or most of their friends were white.

In some ways the data from the Billings Area are the most revealing. This was the only one of the six areas in which the numbers of white and Indian pupils in the public schools were approximately equal. It is significant, then, that more than 80 percent of the pupils of **each** race indicated that all or most of their friends were of their own race.

It seems fair to conclude that, except in the Oklahoma Areas, Indian pupils choose their friends mainly from their own race even though they have an equal or larger number of white schoolmates from whom to choose. And in the public schools of the Billings Area, where the proportion of white and Indian pupils was equal, the white pupils were equally inclined to select their friends from **their** own race.

The Relationship Between Choice of Friends and Achievement

An attempt was made to compare the school achievement of Indian pupils who said that all or most of their friends were white children with those who said they had all or mostly Indian friends. The attempt was not very rewarding. Because of insufficient numbers of Indian pupils claiming all or mostly white friends, comparisons were possible only for Indian pupils in public schools in the sixth grade of the Aberdeen Area and in grades six, seven, and nine of the Muskogee Area. Table 6-s shows the results of these comparisons. None of the differences in mean total score was found to be statistically significant. On the basis of these findings there is not sufficient evidence for accepting the hypothesis that Indian pupils who have mainly white friends achieve better in school than those who do not.

There is no reason for concluding from the data that Indian children do not achieve better by reason of attending school with white children. The data do not bear upon that

TABLE 6-r

FRIENDS

		ABERDEEN			ALBUQUERQUE			BILLINGS		
Grade	Race-School	N	All or Mostly Indian	All or Mostly White	N	All or Mostly Indian	All or Mostly White	N	All or Mostly Indian	All or Mostly White
4	FI	503	96.8%	3.2%	342	98.2%	1.8%	42	95.2%	4.8%
	PI	110	75.5	24.5	14	50.0	50.0	192	85.9	14.1
	MI	147	93.9	6.1	38	97.4	2.6	40	100	00.0
	PW	298	3.0	97.0	303	1.7	98.3	147	13.6	86.4
5	FI	473	95.1	4.9	280	97.5	2.5	54	96.3	3.7
	PI	104	75.0	25.0	13	38.5	61.5	171	83.6	16.4
	MI	146	87.7	12.3	51	100	00.0	46	100	00.0
	PW	316	4.1	95.9	242	0.8	99.2	163	14.1	85.9
6	FI	454	95.6	4.4	299	99.0	1.0	25	100	00.0
	PI	105	66.7	33.3	24	41.7	58.3	151	83.4	16.6
	MI	140	92.1	7.9	66	100	00.0	57	96.5	3.5
	PW	279	1.8	98.2	264	3.8	96.2	149	11.4	88.6
7	FI	424	94.8	5.2	252	98.4	1.6	20	100	00.0
	PI	95	76.8	23.2	62	85.5	14.5	190	89.5	10.5
	MI	126	90.5	9.5	68	100	00.0	50	98.0	2.0
	PW	291	5.8	94.2	267	2.2	97.8	127	18.9	81.1
8	FI	414	93.7	6.3	233	97.4	2.6	13	100	00.0
	PI	69	71.0	29.0	47	72.3	27.7	126	91.3	8.7
	MI	100	86.0	14.0	56	100	00.0	30	100	00.0
	PW	265	4.5	95.5	314	2.9	97.1	105	12.4	87.6
9	FI	300	94.7	5.3	220	94.5	5.5	11	90.9	9.1
	PI	62	62.9	37.1	49	77.6	22.4	70	85.7	14.3
	MI	96	92.7	7.3	11	90.9	9.1	30	86.7	13.3
	PW	301	1.7	98.3	345	2.0	98.0	82	6.1	93.9
10	FI	238	95.8	4.2	156	95.5	4.5	7	85.7	14.3
	PI	84	88.1	11.9	23	73.9	26.1	52	69.2	30.8
	MI	67	95.5	4.5	12	100	00.0	20	100	00.0
	PW	316	3.2	96.8	117	1.7	98.3	84	9.5	90.5
11	FI	167	93.4	6.6	120	96.7	3.3	2	50.0	50.0
	PI	57	89.5	10.5	22	81.8	18.2	35	74.3	25.7
	MI	51	84.3	15.7	11	81.8	18.2	12	100	00.0
	PW	262	00.0	100	74	00.0	100	87	4.6	95.4
12	FI	152	90.8	9.2	78	97.4	2.6	2	00.0	100
	PI	40	65.0	35.0	16	87.5	12.5	32	84.4	15.6
	MI	40	85.0	15.0	13	76.9	23.1	11	100	00.0
	PW	248	0.8	99.2	90	5.6	94.4	69	4.3	95.7

TABLE 6-r (continued)

FRIENDS

		MUSKOGEE			ANADARKO			PHOENIX		
Grade	Race School	N	All or Mostly Indian	All or Mostly White	N	All or Mostly Indian	All or Mostly White	N	All or Mostly Indian	All or Mostly White
4	FI	117	94.0%	6.0%	45	97.8%	2.2%	187	99.5%	0.5%
	PI	67	43.3	56.7	34	44.1	55.9	47	80.9	19.1
	MI							65	100	00.0
	PW	169	2.4	97.6	132	1.5	98.5	75	10.7	89.3
5	FI	82	98.8	1.2	52	90.4	9.6	185	99.5	0.5
	PI	79	34.2	65.8	39	56.4	43.6	34	82.4	17.6
	MI							56	100	00.0
	PW	188	4.8	95.2	146	2.7	97.3	69	2.9	97.1
6	FI	101	96.0	4.0	42	92.9	7.1	151	98.7	1.3
	PI	84	38.1	61.9	22	68.2	31.8	37	73.0	27.0
	MI							76	100	00.0
	PW	190	4.2	95.8	105	1.9	98.1	60	18.3	81.7
7	FI	107	94.4	5.6	101	97.3	3.0	184	98.9	1.1
	PI	78	57.7	42.3	37	43.2	56.8	17	76.5	23.5
	MI							61	98.4	1.6
	PW	185	2.7	97.3	113	00.0	100	41	4.9	95.1
8	FI	100	91.0	9.0	118	94.9	5.1	147	98.6	1.4
	PI	70	60.0	40.0	34	79.4	20.6	17	52.9	47.1
	MI							65	98.5	1.5
	PW	209	2.4	97.6	163	0.6	99.4	50	8.0	92.0
9	FI	116	89.7	10.3	213	89.7	10.3	58	98.3	1.7
	PI	103	45.6	54.4	36	55.6	44.4	19	73.7	26.3
	MI							45	100	00.0
	PW	335	2.4	97.6	170	0.6	99.4	44	9.1	90.9
10	FI	53	84.9	15.1	308	83.1	16.9	91	98.9	1.1
	PI	45	44.4	55.6	20	35.0	65.0	15	73.3	26.7
	MI							22	95.5	4.5
	PW	249	1.2	98.8	151	00.0	100	32	6.3	93.7
11	FI	30	86.7	13.3	245	88.2	11.8	54	90.9	9.1
	PI	41	43.9	56.1	21	47.6	52.4	10	90.0	10.0
	MI							15	100	
	PW	188	3.2	96.8	157	1.3	98.7	28	3.6	96.4
12	FI	31	96.8	3.2	208	82.7	17.3	31	100	00.0
	PI	22	31.8	68.2	16	18.8	81.2	4	50.0	50.0
	MI							13	100	00.0
	PW	199	0.5	99.5	122	00.0	100	17	17.6	82.4

point. It must be remembered that the question concerned "friends"—not associates or schoolmates. Few of us consider every associate a "friend" in the close, intimate connotation that the term usually carries. One may be able to learn from associates without feeling that they are close friends.

What is revealing is the evidence that the integration of the children of two races in a school in the bare sense of attendance does not necessarily lead, immediately at least, to a type of social integration which will cause pupils to choose their friends without regard to race.

TABLE 6-s

A COMPARISON OF ACHIEVEMENT (TOTAL SCORE) WITH RESPECT TO "MOSTLY INDIAN" OR "MOSTLY WHITE" FRIENDS

INDIAN PUPILS IN PUBLIC SCHOOLS

Grade	Number	Group	Mean Score
ABERDEEN AREA			
6	70	Mostly Indian	201.8
	35	Mostly White	194.0
MUSKOGEE AREA			
6	32	Mostly Indian	206.6
	52	Mostly White	198.9
7	45	Mostly Indian	190.3
	33	Mostly White	187.5
9	47	Mostly Indian	213.0
	56	Mostly White	210.5

THE PROPORTION OF WHITE PUPILS IN THE SCHOOLS ATTENDED BY INDIAN PUPILS

An investigation was made of the school achievement of Indian pupils in relation to the proportion of white pupils in the schools they attended. The background data for each pupil indicated whether the school he attended was made up of: 1. only Indians; 2. mostly Indians; 3. half Indians, half whites; 4. mostly whites; 5. only whites. In treating the data, 1 and 2, above, were combined and designated as "mostly Indian" and 4 and 5 were combined and designated as "mostly white."

Obviously there were no Federal or mission schools which enrolled "mostly whites" or even "half Indian, half white" since the main reason for the existence of such schools is the education of Indian youth. Consequently such comparisons as could be made were entirely of Indian pupils attending public schools. All public schools in the study enrolled some Indian pupils else they would not have been included. In some of these schools most of the pupils were Indian. As usual, a minimum requirement of thirty pupils in a category was adhered to before comparisons were made.

As a result, only eight comparisons were possible. These are shown in Table 6-t. The average achievement of Indian children attending schools enrolling "mostly Indian pupils" with that of Indian pupils attending schools enrolling "mostly white pupils" was made in grades four, six, and seven of the Aberdeen Area. Only one difference was found that was statistically significant. Fourth-graders attending "mostly white" schools were higher

TABLE 6-t

COMPARISON OF ACHIEVEMENT (TOTAL SCORE) AS TO PROPORTION OF WHITE CHILDREN IN SCHOOL

Aberdeen Area

Grade	Race-School Group	No. of Pupils	Mean Score
4	PI Mostly Indian[x]	63	139.1
	Mostly White[x]	32	154.0*
6	PI Mostly Indian	45	204.2
	Mostly White	40	205.0
7	PI Mostly Indian	44	190.6
	Mostly White	31	192.6

Billings Area

Grade	Race-School Group	No. of Pupils	Mean Score
4	PI Mostly Indian	140	127.8
	Half Each[x]	47	124.9
5	PI Mostly Indian	109	176.7
	Half Each	54	173.6
6	PI Mostly Indian	102	196.3
	Half Each	34	201.0
7	PI Mostly Indian	138	170.6
	Half Each	35	194.2*
8	PI Mostly Indian	90	202.9
	Half Each	32	203.3

[x] "Mostly Indian" means that sixty-three Indian fourth grade students in the Aberdeen area attended schools composed mainly of Indian pupils. "Mostly White" means that thirty-two Indian fourth graders attended schools composed mainly of white pupils. "Half Each" means that the schools attended by forty-seven Indian pupils in the fourth grade in the Billings area were composed of about equal numbers of Indian and white pupils.

*Significant beyond the .05 level of confidence on the average on total score than those attending "mostly Indian" schools. Differences in grades six and seven were in the direction of the pupils attending "mostly white" schools but they did not differ significantly.

In the Billings Area comparisons were made in grades four through eight between the average achievement of Indian pupils attending public schools which were "mostly Indian" and that of pupils attending schools that were "half Indian, half white." Only one of these differences was found to be statistically significant. This was in grade seven in which the pupils attending schools which were "half Indian, half white" scored higher on the average than those in the "mostly Indian" schools. In grades four and five the differences, although in the direction of the "mostly Indian" schools, were not significant.

In all, the data are not very impressive. There is a slight indication that Indian pupils attending public schools enrolling a large proportion of white pupils achieve better than those attending public schools with mostly Indian pupils but the evidence is by no means conclusive. Combining the probabilities yields a result lower than that which statisticians usually require before attaching significance to a difference.

REGULARITY OF ATTENDANCE

To most persons, and certainly to most teachers, it has been a foregone conclusion that regular attendance in school is an essential ingredient in a pupil's scholastic success. To these persons it may seem a waste of time and effort to investigate the relationship between school achievement and regularity of attendance. The investigators were interested in bringing objective data to bear upon this question, however, for precisely the reason that it is so seldom done. The data do show clearly that, in general, pupils who attend school regularly learn more in the basic skills measured than those who do not. The evidence is remarkable mainly in that it is not more conclusive than it is.

The investigation concerning regularity of school attendance was confined to the day schools of the Aberdeen Area. Distances are great in North Dakota and South Dakota and the winters are long and hard. Roads and weather often conspire against a child's getting to school in the morning. In addition, many of the Indian people in this area engage in seasonal labor of the migrant type which takes them away from their homes, particularly in the early weeks of the school year. It was felt that boarding schools do not encounter attendance problems to the same degree as do day schools.

Table 6-u shows the relationship between regularity of attendance and school achievement in the day schools of the Aberdeen Area. The data are shown by grades and by race-school groups. These are subdivided, further, into two groups on the basis of regularity of attendance and a comparison made of their mean total score on the test battery. A distribution was made of the number of days of absence for each separate race-school group within a grade and the median number of days absence for the group was computed. This resulted, of course, in an approximately equal division of each group. For example, for Indian pupils in Federal schools in grade four, the median number of days of absence per pupil was between fifteen and sixteen. A comparison was then made of the average achievement of those pupils who missed fifteen days of school or less with that of those who missed sixteen days of school or more. The mean difference was found to be 4.6 raw score points. This difference, taken by itself, was not statistically significant.

In all, eighteen separate comparisons were possible, holding to the requirement of not less than thirty pupils in a group. Of these, four were statistically significant. It is noteworthy, however, that sixteen of the eighteen differences were in the direction of the more regular attenders. Neither of the two differences which were in the direction of the irregular attenders was statistically significant. A combining of probabilities of the eighteen differences reveals that, in general, the superiority of achievement of regular attenders

TABLE 6-11

A COMPARISON OF SCHOOL ACHIEVEMENT (TOTAL SCORE) IN RELATION TO REGULARITY OF ATTENDANCE

Day Schools of the Aberdeen Area

Grade	Race-School	Attendance Group (days absent)	Differences Between Means (total score)	Numbers Reg.	Numbers Irreg.
4	FI	15 or less-16 or more	4.6	150	148
	PI	8 or less-9 or more	8.6	51	49
	PW	6 or less-7 or more	4.9	132	131
5	FI	20 or less-21 or more	1.8	115	116
	PI	11 or less-12 or more	5.7	43	45
	PW	8 or less-9 or more	2.3	134	129
6	FI	19 or less-20 or more	14.1*	110	108
	PI	11 or less-12 or more	-6.1	38	37
	PW	8 or less-9 or more	8.2	101	102
7	FI	13 or less-14 or more	10.6	95	90
	PI	9 or less-10 or more	-17.2	30	30
	PW	8 or less-9 or more	12.9	100	100
8	FI	16 or less-17 or more	10.6*	92	86
	PW	8 or less-9 or more	5.8	101	97
9	PW	6 or less-7 or more	8.5	61	59
10	PW	9 or less-10 or more	13.2	76	72
11	PW	8 or less-9 or more	18.5*	64	67
12	PW	11 or less-12 or more	22.2*	68	68

*Significant at or beyond the .05 level of confidence

over irregular attenders is highly significant. Nevertheless, the margin of superiority of irregular attenders over those who were more regular, among seventh-grade Indian pupils attending public schools, may prove surprising to many readers. It should be said that this was the smallest of all the groups with exactly thirty pupils in each category. Differences within the group, of factors other than attendance, apparently overcame the tendency of regular attenders to achieve higher than those who were irregular.

It will be noted that the greatest absence was among Indian pupils attending Federal schools, the next greatest among Indian pupils attending public schools, and the least among white pupils attending public schools. This is not surprising since, as was pointed out earlier in this chapter, the Federal schools serve the less acculturated, and presumably the more isolated portion of the Indian population. Since the mission schools in the Aberdeen Area are mainly of the boarding type, no comparisons involving mission school pupils were possible.

It is recognized that, whereas the attendance data for each pupil was gathered for only **one** school year, every year of the pupil's school experience up to the time of testing had influenced his achievement test scores. It seems reasonable to suppose, however, that, barring prolonged illness or other unusual circumstances, the pattern of attendance of most pupils is probably fairly consistent from year to year.

Finally, it must be borne in mind that regularity of attendance is only one of many variables which influence learning. The data give us no reason to doubt that, if all other variables could be held constant, pupils who attend school regularly would achieve consistently better than those who do not.

EDUCATIONAL ASPIRATION

The investigation revealed a striking and highly significant relationship between the educational aspiration of pupils and their school achievement. The evidence is rather overwhelming that, in general, the higher achieving pupils expect to go farther in school than do the low achievers. The evidence does not reveal which is cause and which is effect, if we assume that a cause and effect relationship exists. That is, we do not know whether pupils aspire to continue in school because they learn well or whether they learn well because their aspiration is high. Perhaps each contributes in some part to the result. All we know is that high aspiration and high achievement tend to go together.

All pupils tested were asked to indicate how far they expected to go in school. Table 6-v shows the numbers of pupils responding, by areas, grades, and race-school groups. It also shows the percentages of pupils in each of three categories: 1. those expecting to go no farther in school than grade eight; 2. those expecting to go beyond grade eight but no farther than graduation from high school; 3. those expecting to take some kind of training beyond high school. This latter did not have to be college, but could be nurses' training or some sort of trade or business training.

These tables of percentages are shown because it is believed that they will be of interest to many readers. The great preponderance of even fourth, fifth, and six-grade pupils, regardless of area or race-school group, expected to get at least some high school training. In general, a larger proportion of the pupils of both races in the Oklahoma areas expected to secure training of some sort beyond high school than was true for pupils of the other areas.

In most of the areas there is a slight, but not a consistent tendency for a greater proportion of white pupils than Indian in the elementary and intermediate grades to aspire to education beyond high school. This proportion is likely to reverse itself in the eleventh and twelfth-grades, however.

TABLE 6-v

PERCENTAGES OF EXPRESSED EDUCATIONAL ASPIRATION

		ABERDEEN AREA				ALBUQUERQUE AREA			
Grade	Race School	N	No Higher Than Grade 8	No Higher Than High School	Training Beyond High School	N	No Higher Than Grade 8	No Higher Than High School	Training Beyond High School
4	FI	487	16.8	68.6	14.6	326	10.2	74.8	15.0
	PI	108	16.7	66.6	16.7	15	00.0	86.7	13.3
	MI	124	21.0	71.0	8.0	36	72.2	16.7	11.1
	PW	275	11.3	70.2	18.5	286	7.0	67.8	25.2
5	FI	459	15.5	71.5	13.0	266	12.4	79.3	8.3
	PI	101	20.8	64.4	14.8	12	8.3	75.0	16.7
	MI	141	18.4	78.0	3.6	50	52.0	32.0	16.0
	PW	285	10.9	61.4	27.7	235	7.2	77.5	15.3
6	FI	436	16.3	75.5	8.2	295	14.6	74.6	10.8
	PI	105	11.4	74.3	14.3	23	4.3	65.2	30.5
	MI	140	7.9	87.9	4.2	66	40.9	43.9	15.2
	PW	251	5.2	78.1	16.7	251	8.0	75.7	16.3
7	FI	421	9.0	79.1	11.9	239	10.5	77.0	12.5
	PI	95	10.5	66.3	23.2	62	3.2	88.7	8.1
	MI	122	6.6	88.5	4.9	68	5.9	88.2	5.9
	PW	286	14.3	68.2	17.5	275	2.2	84.7	13.1
8	FI	409	4.4	75.1	20.5	232	3.0	84.5	12.5
	PI	67	4.5	83.6	11.9	46	00.0	80.4	19.6
	MI	101	3.9	81.2	14.9	55	7.3	89.1	3.6
	PW	261	8.1	70.1	21.8	314	3.8	69.8	26.4
9	FI	297	5.4	80.1	14.5	215	00.0	88.4	11.6
	PI	59	1.7	86.4	11.9	49	2.1	91.8	6.1
	MI	94	1.1	74.5	24.4	11	00.0	54.5	45.5
	PW	301	0.7	78.1	21.2	343	00.0	83.7	16.3
10	FI	236	3.0	82.6	14.4	156	00.0	82.1	17.9
	PI	85	00.0	84.7	15.3	22	00.0	100.0	00.0
	MI	66	1.5	75.8	22.7	12	00.0	33.3	66.7
	PW	312	0.3	82.4	17.3	117	00.0	95.7	4.3
11	FI	164	1.2	68.9	29.9	119	00.0	77.3	22.7
	PI	53	00.0	86.8	13.2	21	00.0	95.2	4.8
	MI	49	00.0	75.5	24.5	11	00.0	45.5	54.5
	PW	261	00.0	83.1	16.9	74	00.0	87.8	12.2
12	FI	149	00.0	72.5	27.5	78	00.0	65.4	34.6
	PI	42	00.0	83.3	16.7	16	00.0	100.0	00.0
	MI	40	00.0	82.5	17.5	13	00.0	69.2	30.8
	PW	249	00.0	88.8	11.2	88	00.0	100.0	00.0

TABLE 6-v (continued)

		ANADARKO AREA				PHOENIX AREA			
Grade	Race School	N	No Higher Than Grade 8	No Higher Than High School	Training Beyond High School	N	No Higher Than Grade 8	No Higher Than High School	Training Beyond High School
4	FI	12	00.0	25.0	75.0	184	34.2	60.3	5.5
	PI	24	00.0	37.5	62.5	46	2.2	80.4	17.4
	MI					64	62.5	37.5	00.0
	PW	99	00.0	50.5	49.5	75	5.3	60.0	34.7
5	FI	32	9.4	56.2	34.4	182	17.6	69.2	13.2
	PI	34	00.0	70.6	29.4	34	38.2	44.1	17.7
	MI					54	59.3	38.9	1.8
	PW	132	0.7	37.9	61.4	67	11.9	64.2	23.9
6	FI	29	3.4	38.0	58.6	149	12.1	84.6	3.3
	PI	15	00.0	46.7	53.3	39	2.6	56.4	41.0
	MI					75	41.3	58.7	00.0
	PW	86	2.3	43.0	54.7	62	8.1	59.7	32.2
7	FI	63	00.0	65.1	34.9	183	10.9	84.7	4.4
	PI	26	00.0	38.5	61.5	17	00.0	58.8	41.2
	MI					60	35.0	65.0	00.0
	PW	78	00.0	38.5	61.5	41	7.4	46.3	46.3
8	FI	84	00.0	59.5	40.5	147	7.5	85.7	6.8
	PI	23	00.0	34.8	65.2	17	00.0	70.6	29.4
	MI					65	29.2	70.8	00.0
	PW	138	1.4	34.8	63.8	49	00.0	63.3	36.7
9	FI	142	0.7	59.9	39.4	56	00.0	92.9	7.1
	PI	28	00.0	53.6	46.4	19	00.0	100.0	00.0
	MI					43	00.0	97.7	2.3
	PW	122	00.0	39.3	60.7	44	00.0	97.7	2.3
10	FI	210	00.0	44.3	55.7	89	00.0	89.9	10.1
	PI	17	00.0	35.3	64.7	15	00.0	93.3	6.7
	MI					22	00.0	90.9	9.1
	PW	121	00.0	49.6	50.4	32	00.0	100.0	00.0
11	FI	194	00.0	43.8	56.2	55	00.0	85.5	14.5
	PI	18	00.0	11.1	88.9	10	00.0	100.0	00.0
	MI					14	00.0	100.0	00.0
	PW	105	00.0	48.6	51.4	28	00.0	96.4	3.6
12	FI	139	00.0	31.7	68.3	31	00.0	100.0	00.0
	PI	14	00.0	21.4	78.6	4	00.0	100.0	00.0
	MI					13	00.0	100.0	00.0
	PW	107	00.0	37.4	62.6	17	00.0	100.0	00.0

TABLE 6-v (continued)

		BILLINGS AREA				MUSKOGEE AREA			
Grade	Race School	N	No Higher Than Grade 8	No Higher Than High School	Training Beyond High School	N	No Higher Than Grade 8	No Higher Than High School	Training Beyond High School
4	FI	39	7.7	61.5	30.8	68	10.3	60.3	29.4
	PI	191	16.2	66.0	17.8	59	3.4	55.9	40.7
	MI	43	2.3	95.4	2.3				
	PW	118	4.2	61.0	34.8	139	5.0	58.3	36.7
5	FI	57	8.8	68.4	22.8	45	13.3	60.0	26.7
	PI	161	11.2	64.6	24.2	65	10.8	46.2	43.0
	MI	52	9.6	82.7	7.7				
	PW	159	8.2	52.8	39.0	146	2.0	33.6	64.4
6	FI	33	6.1	87.8	6.1	80	6.3	45.0	48.7
	PI	147	8.8	76.2	15.0	62	4.8	46.8	48.4
	MI	57	3.5	91.2	5.3				
	PW	147	0.7	68.7	30.6	167	3.0	54.5	42.5
7	FI	27	11.1	88.9	00.0	88	5.7	59.1	35.2
	PI	189	5.8	65.1	29.1	64	00.0	50.0	50.0
	MI	48	6.3	91.6	2.1				
	PW	127	3.9	58.3	37.8	163	1.8	44.8	53.4
8	FI	13	7.7	92.3	00.0	69	1.4	76.8	21.8
	PI	119	1.7	66.4	31.9	42	00.0	57.1	42.9
	MI	29	3.4	93.2	3.4				
	PW	105	3.8	57.2	39.0	159	00.0	39.0	61.0
9	FI	10	00.0	60.0	40.0	60	00.0	51.7	48.3
	PI	69	00.0	69.6	30.4	87	00.0	69.0	31.0
	MI	30	00.0	100.0	00.0				
	PW	82	00.0	87.8	12.2	294	00.0	61.9	38.1
10	FI	7	00.0	14.3	85.7	38	00.0	28.9	71.1
	PI	48	00.0	62.5	37.5	41	00.0	48.8	51.2
	MI	20	00.0	100.0	00.0				
	PW	82	00.0	72.0	28.0	205	00.0	57.6	42.4
11	FI	2	00.0	100.0	00.0	25	00.0	28.0	72.0
	PI	35	00.0	100.0	00.0	32	00.0	43.8	56.2
	MI	11	00.0	100.0	00.0				
	PW	86	00.0	77.9	22.1	168	00.0	57.1	42.9
12	FI	2	00.0	100.0	00.0	19	00.0	15.8	84.2
	PI	26	00.0	88.5	11.5	22	00.0	22.7	77.3
	MI	11	00.0	100.0	00.0				
	PW	67	00.0	86.6	13.4	175	00.0	48.6	51.4

TABLE 6-w

DIFFERENCES IN MEAN ACHIEVEMENT (TOTAL SCORE) IN RELATION TO EXPRESSED EDUCATIONAL ASPIRATION

ABERDEEN AREA

Grade	Race-School	Groups (by aspiration)	Differences Between Means
4	FI	2-1	5.2
		3-1	9.3
		3-2	4.1
	PW	2-1	31.0*
		3-1	46.3*
		3-2	15.3*
5	FI	2-1	7.1
		3-1	27.7*
		3-2	20.5*
	PW	2-1	25.7*
		3-1	39.4*
		3-2	13.7*
6	FI	2-1	14.3*
		3-1	22.4*
		3-2	8.1
	PW	3-2	27.5*
7	FI	2-1	17.3*
		3-1	38.8*
		3-2	21.5*
	PW	2-1	10.3
		3-1	31.7*
		3-2	21.4*
8	FI	3-2	15.1*
	PW	3-2	18.2*
9	FI	3-2	11.2
	PW	3-2	15.1*
10	FI	3-2	22.6*
	PW	3-2	30.5*
11	FI	3-2	16.5*
	PW	3-2	23.2*
12	FI	3-2	11.7

BILLINGS AREA

Grade	Race-School	Groups (by aspiration)	Differences Between Means
4	PI	2-1	10.6*
		3-1	19.5*
		3-2	8.9
	PW	3-2	10.5
5	PI	3-2	15.3*
	PW	3-2	9.0
6	PW	3-2	19.8*
7	PI	3-2	10.2
	PW	3-2	1.5
8	PI	3-2	8.2
	PW	3-2	28.9*

MUSKOGEE AREA

Grade	Race-School	Groups (by aspiration)	Differences Between Means
4	PW	3-2	-5.3^{X}
5	PW	3-2	22.8*
6	FI	3-2	-6.6
	PW	3-2	21.8*
7	FI	3-2	17.3
	PI	3-2	12.2
	PW	3-2	33.0*
8	PW	3-2	41.6*
9	PW	3-2	32.4*
10	PW	3-2	30.5*
11	PW	3-2	42.5*
12	PW	3-2	28.0*

TABLE 6-w (continued)

ALBUQUERQUE AREA

Grade	Race-School	Groups (by aspiration)	Differences Between Means
4	FI	2-1	.6
		3-1	13.0*
		3-2	12.4*
	PW	3-2	21.4*
5	FI	2-1	15.8*
	PW	3-2	16.1*
6	FI	2-1	8.7
		3-1	37.5*
		3-2	28.7*
	PW	3-2	28.3*
7	FI	3-2	4.4
	PW	3-2	29.4*
8	PW	3-2	35.2*
9	PW	3-2	44.9*

PHOENIX AREA

Grade	Race-School	Groups (by aspiration)	Differences Between Means
4	FI	2-1	-9.9
5	FI	2-1	32.9*

ANADARKO AREA

Grade	Race-School	Groups (by aspiration)	Differences Between Means
4	PW	3-2	7.7
5	PW	3-2	11.5*
6	PW	3-2	9.8
7	PW	3-2	12.5
8	FI	3-2	14.3
	PW	3-2	35.9*
9	FI	3-2	10.6
	PW	3-2	17.6*
10	FI	3-2	5.6
	PW	3-2	31.9*
11	FI	3-2	27.1*
	PW	3-2	26.0*
12	FI	3-2	32.4*
	PW	3-2	39.8*

Group 1: level of aspiration expressed at grade 8 or less
Group 2: level of aspiration expressed at grades 9 through 12
Group 3: level of aspiration expressed beyond high school

*Significant at or beyond the .05 level of confidence

[x] A negative difference indicates that the lower level of aspiration was higher in mean achievement than was the higher level.

It may be observed that in some of the areas a scattered few pupils who were in the high school grades indicated that they did not expect to go beyond the eighth grade. Obviously this resulted from their misunderstanding the question or inadvertently marking in the wrong space.

Table 6-w shows comparisons of the average achievement (total score) of the three groups as defined by level of aspiration. These are shown by areas, grades, and race-school groups. Comparisons, as usual, were confined to those groups having thirty or more pupils. In all, eighty-three separate comparisons were possible. Of these, all but three showed the higher aspiring group to have the higher mean achievement score. Of these eighty differences favorable to the higher aspiring groups, fifty-five were statistically significant. Of the three differences favorable to the lower aspiring groups, none was statistically significant.

It was noted that of thirty-three comparisons involving Indian pupils in Federal schools, seventeen or slightly more than half were statistically significant. Of those involving white pupils in public schools, thirty-five of forty-three, or slightly more than 80 percent were significant. Three of seven differences involving Indian pupils in public schools were found to be significant. No comparisons involving Indian pupils attending mission schools were possible because of insufficient numbers. There was a tendency for the differences between groups of white pupils to be larger than was true of Indian pupils.

It is of special interest to note that even at the fourth-grade level the relationship between educational aspiration and achievement had begun to manifest itself.

CHAPTER VII

THE USE OF TEST RESULTS FOR PUPIL GUIDANCE AND THE IMPROVEMENT OF INSTRUCTION

In Chapter II the use of achievement test results for pupil guidance and improvement of instruction, at the classroom level, was described as being among the purposes of the testing program as envisioned at the very outset. In this chapter the manner in which this purpose was implemented will be described.

Since the inception of the educational testing movement, less than fifty years ago, down to the present day, many teachers have confused the giving and scoring of achievement tests and the recording and inspection of the results with having an actual testing program. In many quarters the giving of tests has been considered the "thing to do." If a testing program includes nothing more than the elements listed above, it scarcely is worth doing at all. The interpretation and analysis of tests results in a professional manner, so that they will throw helpful light on the real problems of education, is admittedly the difficult part of the testing process.

The University of Kansas and the Evaluation Office of the Education Branch of the Bureau of Indian Affairs early committed themselves to the task of developing for the co-operating schools interpretive devices and techniques, consistent with the most advanced practices in educational measurement, and teaching school personnel how to use them.

THE NEED FOR AREA NORMS

In Chapter III the differences in level of achievement among the several administrative areas of the Bureau of Indian Affairs have been demonstrated. It has also been shown that these areas differ markedly from each other with respect to certain cultural factors. For these reasons it was considered best to establish for each area a set of separate or differentiated norms, based on the achievement of the pupils of that particular area.

Since it is always necessary, in evaluating test results, to have some sort of norm available as a standard of comparison, the alternative to an "area" norm would have to be the published norms of the California Achievement Test, commonly referred to as a "national" norm. These norms are expressed as percentile ranks or grade or age equivalents. Of these, the one in most widespread use is undoubtedly the grade equivalent. The reasons for this are readily understandable. Teachers are accustomed to thinking of pupils in terms of grade levels. If, for instance, a pupil gets a total of 230 items correct on the elementary battery of the California Achievement Test, he is, presumably, achieving at the 6.2 grade level; i.e., the second month of the sixth grade. All of this is beguilingly simple and comprehensible. It is only when one begins to make a more critical approach to the concept of a "national" norm, expressed in grade equivalent values, that certain danger signals come into focus.

The primary danger is that of accepting a grade equivalent score as an absolute value rather than a relative one. Each test maker standardizes his test on a population of pupils of his own choosing. It is true that he tries, usually, to make his sampling of pupils representative of the pupils of the entire country. But his population of pupils will differ from that of another equally reputable test-maker in point of numbers, location of residence, cultural factors, and in many other ways. Besides this, the two tests are different from each other. As a result, if the pupil is given two different achievement tests at approximately the same time, he will probably come out with differing grade equivalent values and sometimes these variations are astonishingly wide.[1] Who is to say which, if either, is his "true" grade equivalent score?

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[1] Arthur T. Tait. **A Comparative Study of Five Major Achievement Tests.** (Mimeographed report, California Test Bureau.)

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If, however, we do accept the principle of the "national" norm, it is of dubious help in specific educational situations. The "normal" child, on a national scale, is a mythical creature. Because of the cultural influences involved we have no right to expect that the Apache child, for example, will achieve in the same way as the child of the Philadelphia lawyer, or the Detroit automobile worker, or the Dakota wheat farmer, or the Hollywood movie star. Nor does it help very much to roll them all up into one and claim that the composite result is typical of the country as a whole. It is true that by setting up area norms we have not eliminated cultural factors, but by confining our populations to rural children from the same general localities we have certainly minimized them.

Another pitfall of conventional grade equivalent norm tables is what has been described as "false precision" of measurement. If, for example, a fourth-grade pupil gets one item correct on the arithmetic reasoning section of the elementary battery of the California Achievement Test, he is said to be achieving at the 1.7 grade level, but if he gets two items correct we are told that he is achieving at the 2.1 grade level. This is a difference of .4, or nearly half, of a grade. Since there are forty-five items in this section of the test and the items are of the multiple choice type, it must be perfectly evident that the difference between one and two items could have occurred by chance and very likely did. Too often this elemental fact is not stressed with the teacher when she is encouraged to use grade equivalent norms.

Desirable as differentiated norms are, however, they are not often available. The establishment of satisfactory norms is a task calling for an expenditure of considerable time and money, the possession of some specialized equipment, and a great deal of professional skill. The University of Kansas, during the period 1951-55, developed six such sets of norms for the Bureau of Indian Affairs, in fall testing programs, and a set of spring testing norms (for the Albuquerque Area).

INTERPRETING THE TEST RESULTS

The California Achievement Tests

The California Achievement Tests are designed to measure achievement in six basic skills: reading vocabulary, reading comprehension, arithmetic reasoning, arithmetic fundamentals, mechanics of English and grammar, and spelling. The six part scores when added together yield a total score. The test is published in four levels: primary for grades 1, 2, 3, and low 4; elementary for grades 4, 5, and 6; intermediate for grades 7, 8, and 9; and advanced for grades 10, 11, and 12. Since testing in this program started with grade four, the primary level was not used. The tests at the different levels contain entirely different items and are, of course, progressively more difficult.

The Area Norms

The University, then, constructed separate norms for each level of the test, and for each grade within each level, for each of the six areas. The sole exception to this was in Oklahoma where no statistical difference was found between the achievement of tenth, eleventh, and twelfth grade students in the Anadarko and Muskogee Areas and they were combined into one norm group.

The Interpretive Devices

The Profile Sheet. A profile sheet was constructed for each level of the test for each area. A profile sheet is simply a graphic method of presenting a pupil's test scores in order that certain comparisons can be made and certain judgments reached. These profile sheets were reproduced in sufficient quantity to provide the schools with one for each pupil tested.

The material which follows in this chapter is set forth much as it was presented to supervisors and teachers in the field as a part of an in-service training program.

Figure VII-1 is a picture of a profile sheet. It and the other devices illustrated in this chapter are specific to one of the six areas, but they are illustrative only and do not differ in principle from the materials developed for the other areas. The profile sheet shown in Figure VII-1 is for the elementary level of the California Achievement Tests and is based on 1,585 pupils in grades 4, 5, and 6.

The seven columns representing the several skills and total score show distributions of raw scores. A "raw" score in this case means simply the number of items a pupil answered correctly. Taken by themselves raw scores have no meaning. If a pupil gets thirty items right on the reading vocabulary test we do not know whether this is good, bad, or mediocre. That judgment will have to be made in relation to what other pupils do on the test. Raw scores cannot be compared directly. Thirty items would be one-third of the items on the vocabulary section, for example, but they would include all of the words in the spelling section and thus would be a perfect score.

Consequently, we must put raw scores into some frame of reference if they are to have meaning. This has been done by transforming the raw score distributions to a normalized T-score scale. This scale is shown at the sides of the profile sheet. The heavy black line, running across the middle of the page from a T-score of 50, represents the **median, or average,** achievement for the combined group of fourth, fifth, and sixth-grade pupils. The lines running from T-scores of 60 and 40 represent, respectively, achievement one standard deviation above and one standard deviation below the average. Even though the teacher is not familiar with this statistical terminology it can take on real meaning for her very quickly when she is told that the test scores of about two-thirds of the pupils of the area fall between T-scores of 60 and 40. Approximately one-sixth of the pupils will be above a T-score of 60 and about the same number below a T-score of 40.

The Grade Norm Overlay. The teacher, of course, is interested in comparing the achievement of her pupil not only in relation to the level of the test, but also with reference to the achievement of other children of the same grade. Figure VII-2 shows how this need has been provided for. The four lines shown on this profile in reality are derived from two separate sheets of material. One line represents the same fourth-grade scores of the pupil whose scores for the fourth, fifth, and sixth grades were shown in Figure VII-1. It is the profile with a single dash between the score points, running from a score of 57 in reading vocabulary to a score of 137 for the total test. The other three lines are obtained from a sheet of transparent cellulose acetate on which the lines are drawn. In practice the transparency is placed over the profile sheet and correctly fitted to it. It is then called an "overlay." The solid middle line of these three shows mean achievement for grade four. The broken lines above and below the mean line represent plus and minus one standard deviation, respectively, from the mean. The figure illustrates what the user of these devices sees when he properly registers a fourth-grade overlay on a fourth-grade profile.

Describing Levels of Achievement. Now we are in a position to assign descriptive adjectives to achievement. If a pupil's score falls above the top broken line it lies in the top one-sixth of the norm group and may be called "superior." If it falls between the solid middle line and the top broken line it may be characterized as "high average"; if between the the middle line and the bottom broken line, as "low average." Each of these segments represents about one-third of the norm group. If the score falls below the bottom broken line, it will be in the lowest one-sixth of the norm group and may be called "low".[2]

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[2] Norm tables stratifying raw scores in this way have been developed for each area. A sample appears in Appendix D.

Figure VII-1

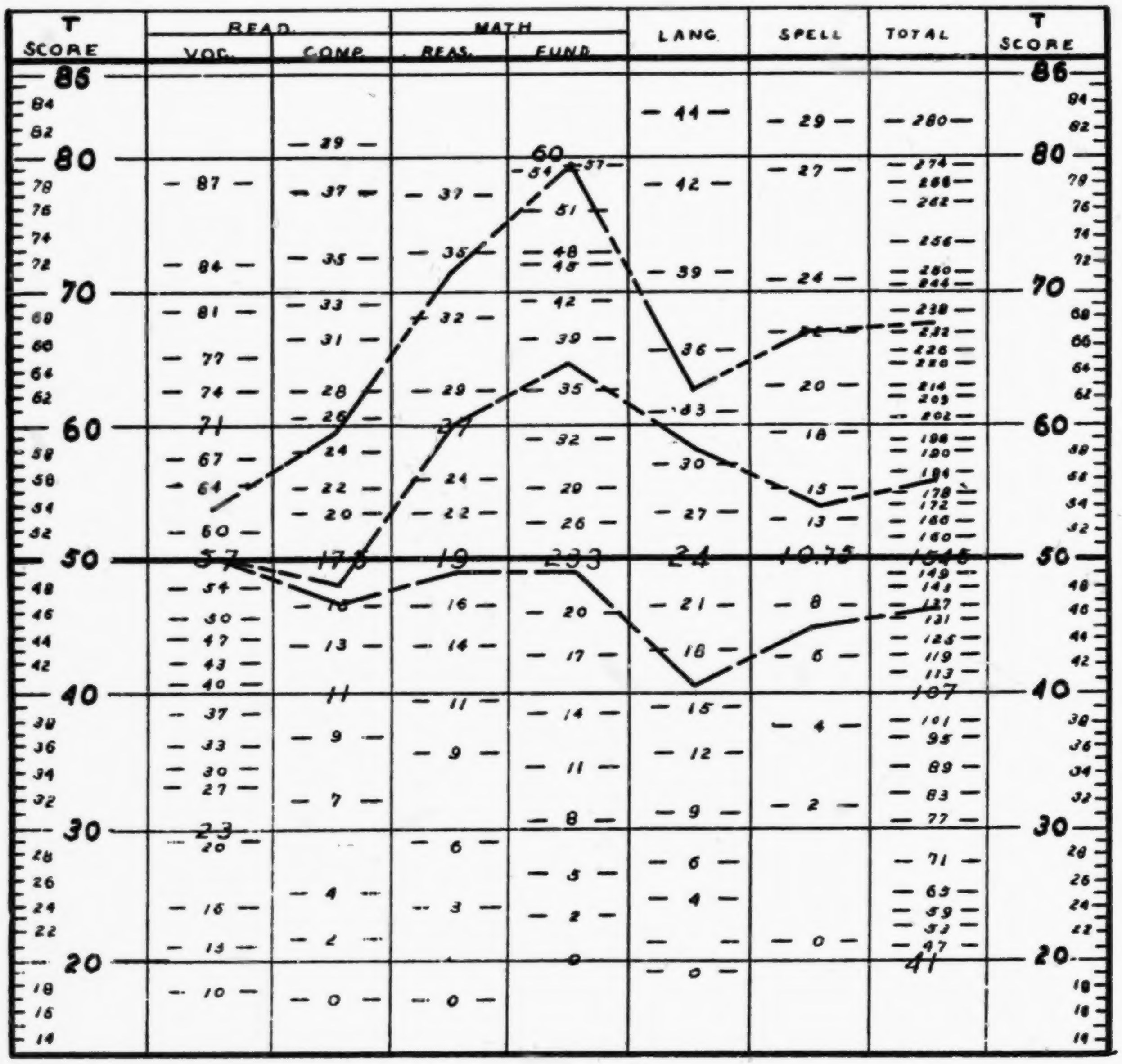
U.S.I.S. Education Branch
STUDENT PROFILE
California Achievement Battery - Elementary Level
Phoenix Area

Date ________ Grade 4, 5, & 6

Name ______________________ ________ ________

School ______________________ ________ ________

N=1585



Remarks:

Plotting the Student Profile. Let us look again at Figure VII-1. Here we see the achievement profile of an actual pupil (anonymous but real) for three consecutive years; grades 4, 5, and 6. The pupil's raw scores were plotted by finding the appropriate score in the proper column and marking it in the **middle** of the column. If the pupil's score is not actually shown in the column, the distance should be divided, proportionately, between the scores on each side of his. After the points were plotted they were connected with straight lines. Teachers were encouraged to use different colors in profiling scores for different years.

Making Useful Comparisons. What comparisons can we now make that will permit judgments helpful in the guidance of the pupil? These comparisons are mainly of three types. First is the comparison of the scores of one pupil with those of another. This we may call an "inter-individual" comparison. This is probably the least common use of test scores. Second is the comparison of a pupil's achievement in one skill with his own achievement in a different skill. This we will call an "intra-individual" comparison. This technique may be very useful and important. By this means a teacher may learn the specific strengths and weaknesses of a pupil. Is John better in reading comprehension than he is in arithmetic fundamentals? The answer to this question may have much to do with the placing of teaching emphasis, the planning of remedial work, or the selection of learning materials for John. Third is a comparison of the pupil's scores with those of the group of which he is a member. This is probably the most common use of test scores and we will call these "individual-group" comparisons.

1. Using a Grade Norm. Let us illustrate the suggested uses by studying Figure VII-2 for a moment. We note that as a fourth-grader this pupil's achievement was largely at the high average level by comparison with other fourth-graders of his area; i.e., between the mean and one standard deviation above. He was not superior in any skill. In language he was well down in the low average level and in spelling he was very close to the mean line. His scores seem fairly consistent except for his performance in language. How can we be sure, though, that he was really poorer in language than in some of the other skills? He seems to have been somewhat lower in reading comprehension than in reading vocabulary. Is this enough of a difference that we should attach any importance to it?

2. Making Allowance for Error in Measurement. It will be remembered that earlier a complaint was lodged against grade equivalent scores because of what was called "false precision" in measurement and it was shown that some differences occur purely by chance. It is important to make allowance for this and not to assume that every difference between scores, however minute, is significant. A statistical analysis of the several profile sheets constructed showed that the number of T-scores of difference necessary to be significant at the 5 percent level of confidence ranged between seven and nine. It seemed that a workable "rule of thumb" would require eight T-scores of difference between pairs of scores before a difference would be considered significant. (See Appendix D.) Then, in other words, only five times in a hundred would a difference this large or larger have occurred by chance alone.

3. Applying the Test of Significance. Applying the "rule of thumb" stated above to Figure VII-2, we see that there is really no significant difference between the two fourth-grade reading scores. In fact, we cannot be sure that any of the scores are different from each other, except that language is definitely lower than reading vocabulary and both of the arithmetic scores.

4. Measuring Growth as well as Status. So far we have commented only upon the pupil's status of achievement at a given time. As noted before, however, in Figure VII-1 his achievement for three consecutive grades is profiled. This enables us to study his growth in learning over this period of time and is one of the most helpful of all uses of test results. Recently the teaching profession has become much more aware of the value of this function of testing. If we are sincere in our acceptance of the educational axiom that "we must accept the child where we find him," then necessarily we must be more concerned about his development than about the status of his achievement at any one point in time.

Figure VII-2

U.S.I.S. Education Branch

STUDENT PROFILE

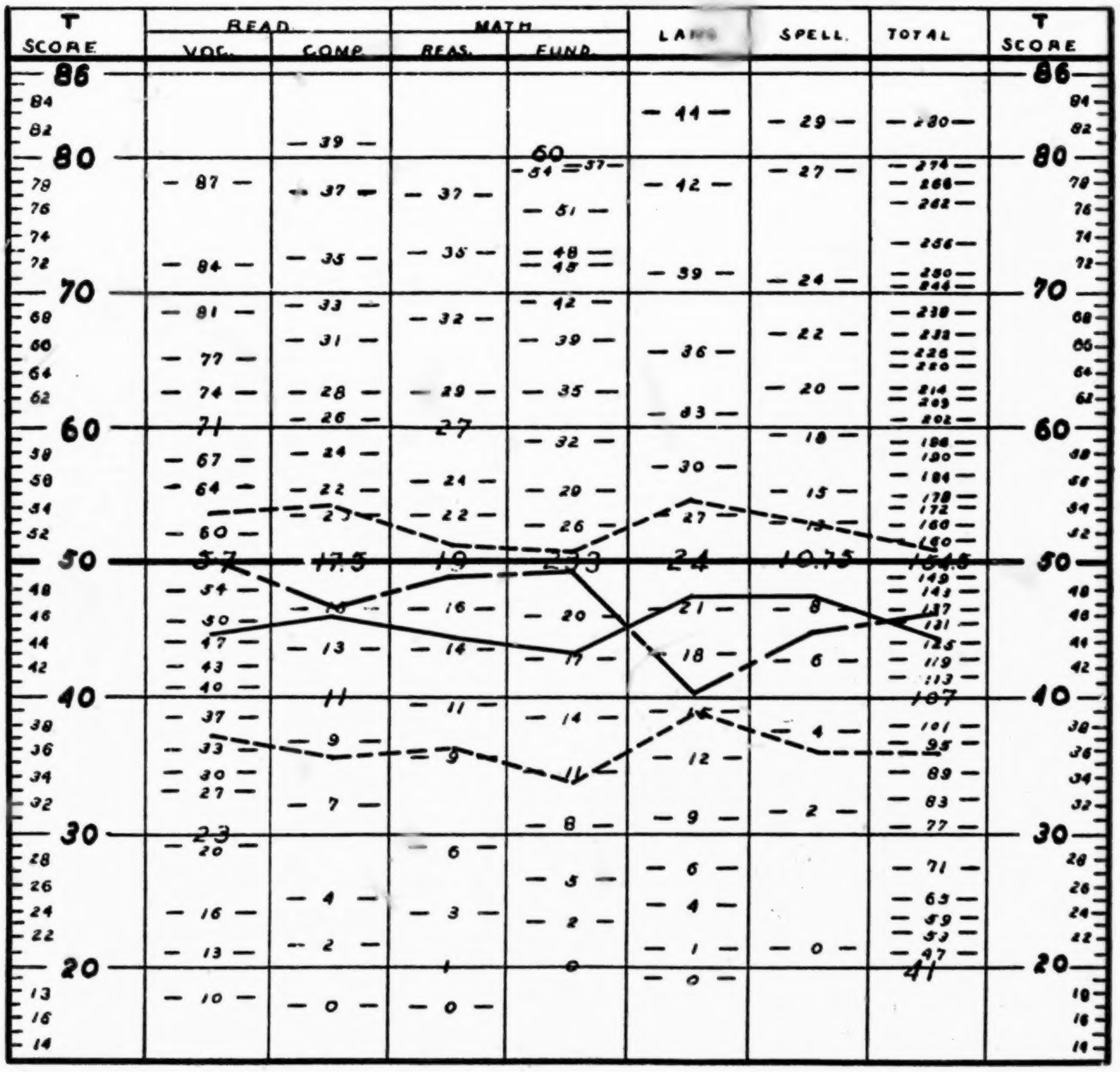
California Achievement Battery - Elementary Level

Phoenix Area

Name ______________________ Date __________ Grade 4

School ______________________

N=1585



Remarks:

There is abundant evidence that the pupil in Figure VII-1 is learning but that he is not learning equally well in all the skills. Obviously, reading vocabulary is his weakest spot so far as development at these grade levels is concerned. He showed no growth in that skill between grades four and five and no significant growth between grades five and six. His gain in reading comprehension between grades four and five was not significant, but it was significant between grades five and six. His gains in both arithmetic skills were large and significant between all grade levels and it is apparent that his learning in arithmetic is out stripping that in the other skills. His growth in language was very large between grades four and five but was not significant between grades five and six. His growth in both spelling and total score was significantly large between all grade levels.

5. Using the Sequence of Grade Norms. When we use the fifth grade norm on the same profile, as in Figure VII-3, we see that, whereas the pupil was "high average" in both reading skills at the fourth-grade level, as a fifth-grader he was exactly at the average line in reading vocabulary and had slipped into the "low average" in reading comprehension. In the arithmetic skills, however, he had moved up into the superior level. His language achievement had moved up from low average to high average and his spelling score, which was at the average line in grade four, was high average in grade five. His total score maintained its position at the high average level.

In Figure VII-4 the sixth grade norm is shown on the same profile sheet. We now observe that the pupil is definitely at the superior level in the two arithmetic skills and is particularly high in arithmetic fundamentals. He is at the superior level also in spelling and total score. He is at the high average level in language and reading comprehension Only in reading vocabulary is he slightly below the average line for sixth-grade pupils. Only in reading vocabulary and language was his growth between grades five and six so small that there is doubt about its significance.

When one compares Figure VII-2 with Figure VII-4 it becomes apparent that the growth of this pupil over the three-grade span has been much greater than normal. Whereas he was only slightly above average as a beginning fourth-grader, he is generally at the superior level as a beginning sixth-grader. Obviously this pupil has rather high capacity for learning. His achievement in arithmetic, however, is outrunning his learning in the language skills and his growth in reading vocabulary, even over the span of three grades, has not been significant. It will be seen that in order to make judgments of this kind concerning pupil growth it is necessary to administer the tests at approximately the same time each year in order to get a measure of one year's growth. Also, since the norms were established on data obtained in the fall of the year, it is necessary to continue giving the tests in the fall. There is no evidence that pupil growth continues at an even pace throughout all parts of the school year.

Factors Influencing Learning

It should be noted that the test scores and the use of the profiles and grade norms tell us only **what** is true and not **why** it is true. In order to make judgments concerning the causes of differences we need to utilize other information about the pupil to which we may have access.

For instance, it might be suggested that the pupil in our example is learning faster in arithmetic than in reading because arithmetic is being taught better or that more emphasis is being placed upon it. It becomes important to know, then, that this pupil had three different teachers in the three different grades and if the above theory is correct it is true of at least two of the three teachers rather than only one.

It is also illuminating to know that this pupil comes from a non-English-speaking home where the child has scant opportunity to speak English and is not encouraged to do so. Manifestly most of his vocabulary building must be done at school. In this respect he differs from most children in America and from most of the non-Indian children, and many

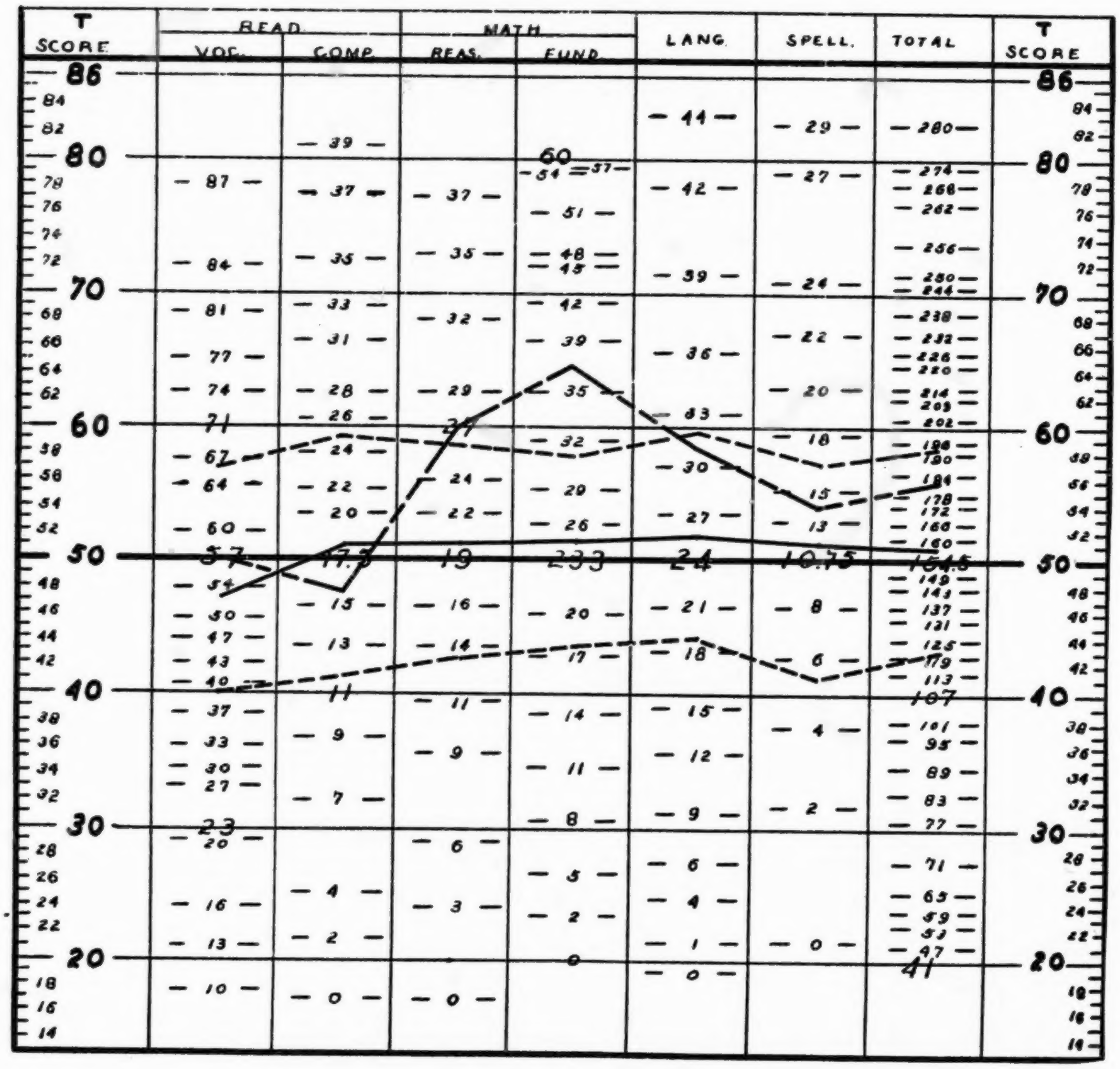
Figure VII-3

U.S.I.S. Education Branch
STUDENT PROFILE
California Achievement Battery - Elementary Level
Phoenix Area

Name ______________________ Date __________ Grade 5

School ______________________

N=1585



Remarks:

Figure VII-4

U.S.I.S. Education Branch

STUDENT PROFILE

California Achievement Battery - Elementary Level

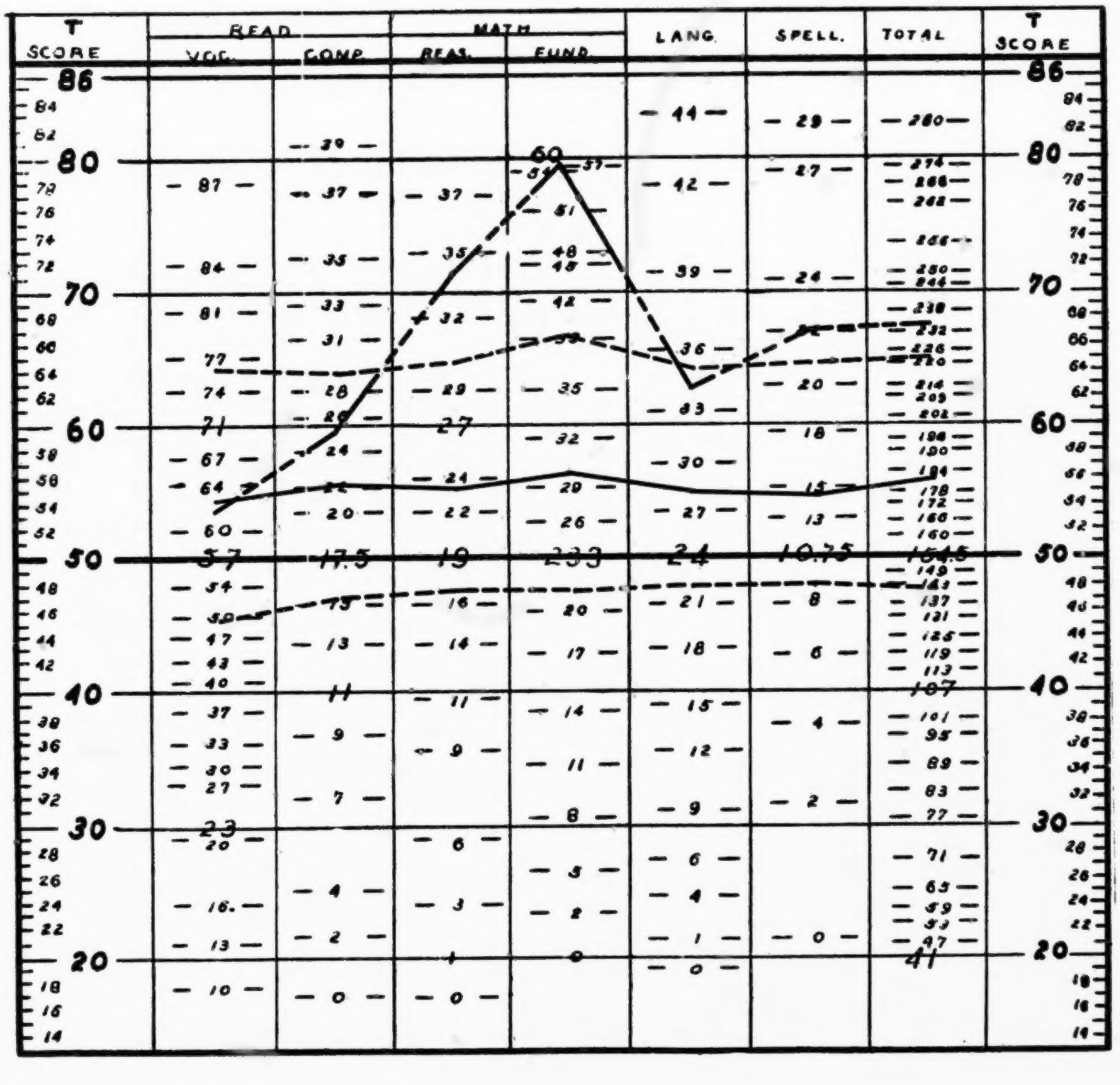
Phoenix Area

Date ______ Grade 6

Name ____________________

School ____________________

N=1585



Remarks:

of the Indian children in his own area who develop vocabulary skills outside of school as well as in.

We have inferred already that this pupil has a high learning potential. It seems quite reasonable to suppose that he is compensating for his difficulties in acquiring vocabulary and other verbal skills by applying his abilities with special zeal to learning the arithmetic skills. In the latter field he is not so much at a disadvantage with children from English-speaking homes, since most children learn the greater part of their arithmetic skills in school. If these latter theories are correct, then it becomes apparent that the school has a special obligation to enrich this pupil's language opportunities by every means at its command.

The above material has not been offered as a definitive treatment of the use of the interpretive devices, but has been intended as illustrative only. The resourceful and interested teacher will find many ways to use them to her and the pupil's advantage. Achievement needs to be considered in the light of mental ability, motivation, emotional adjustment, teaching emphasis,, and learning opportunity.

Perhaps with respect to his ability a pupil is doing very well, although his scores are not high; or perhaps he should be doing much better. Need for remedial work may be indicated for some pupils in certain learning areas. The test results may be useful in the grade placement of pupils and in ability grouping, if this is consistent with school policy.

An Additional Device for Interpretation

Until lately it has not been possible to study pupil growth between grades six and seven and grades nine and ten because of the changes of test batteries at those grade levels. Recently, however, a satisfactory method has been devised for converting scores of the intermediate battery into equivalent elementary level scores, and vice versa, and the same thing can be done as between the intermediate and advanced levels.[3] This will make possible a continuous evaluation of pupil growth from grade four through grade twelve. Those interested in using the method are referred to **Pupil Test Score Differences in the Phoenix Area** by Dr. Carl E. Ladd, available from the Education Branch of the Bureau of Indian Affairs.

Use in Group Evaluation

The profiles and grade norms may also be used in evaluating the progress of groups of pupils.[4] The material presented hereinafter is taken from a model study done on a selected day school operated by the Bureau of Indian Affairs. It represents twenty-three pupils who were tested in the fourth grade in the fall of 1951 and who progressed to the fifth grade in the same school and were tested a year later in 1952. Twenty of the same pupils advanced to the sixth grade in 1953 and were again tested in the fall of that year. No selection of pupils was exercised and the group here presented comprised the entire grade, except for those pupils who transferred or dropped out. The scores of the individual pupils were averaged together.

Figure VII-5 is a profile of these mean scores for grades four, five, and six. It will be observed that what was true of the achievement of the individual pupil discussed earlier, who was a member of this group, is more or less true of the group as a whole. Greater gains were made in the arithmetic skills between grades four and six than in the verbal skills.

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[3] Carl E. Ladd. **The Educational Growth of Indian Children in the Phoenix Area, 1951-1952, as Measured by Test Results.** (Unpublished doctoral thesis, University of Kansas, 1955, pp. 255.)

[4] Inasmuch as the profile sheet was designed for use with individuals, primarily, its use with group data is subject to certain limitations. For example, when scores are averaged together, the mean scores have greater reliability than any individual scores. The rule of eight T-score units being necessary for a significant difference no longer holds true. Since the number of T-score units necessary to indicate a significant difference between the means of groups varies with the size of the group, and the size of classes is not constant, it is impracticable to calculate this value except for a particular group. It can be said, at least, that with group scores the allowance does not need to be as large as with individuals. It also seems safe to say that whenever the difference is at least as large as the normal difference between the grade means for the area it is not a chance difference.

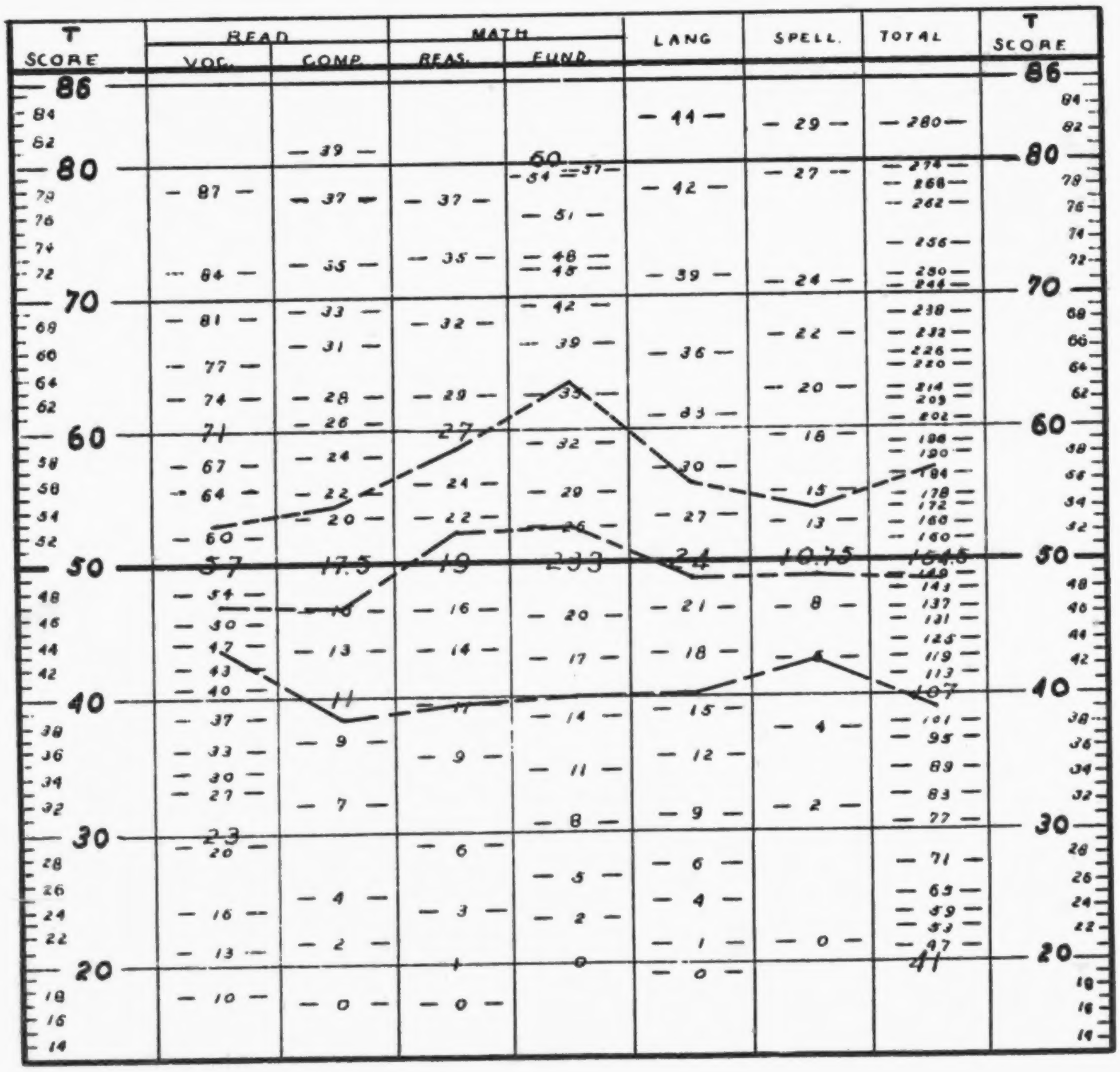
Figure VII-5
U.S.I.S. Education Branch
STUDENT PROFILE
California Achievement Battery - Elementary Level
Phoenix Area

Date ________ Grade 4, 5, & 6

Name ______________________ ________ ________

School ______________________ ________ ________

N=1585



Remarks:

Growth in reading vocabulary, particularly, seems to lag behind that in the other skills. The growth in arithmetic fundamentals is especially large. One must be impressed, however, by the fact that this group showed significant growth in every skill each year. A test of significance showed that in every instance the differences were significant beyond the .01 level of confidence. That is to say that the probability was less than one in a hundred that the difference occurred by chance alone.

In Table 7-a[5] the growth between grades four and five is shown in terms of T-scores and is compared with the normal differences between these grades for the area. Only in reading vocabulary was the gain less than normal. In Table 7-b growth for the group between grades five and six is shown. At this level their growth was normal or greater in every skill and on total score. It will be noted that the gain even in reading vocabulary was greater than normal between grades five and six. It can be hoped that this was a result of teacher awareness of the problem and increased attention to it.

Table 7-a

GROWTH BETWEEN GRADES 4 AND 5

Mean Scores — 23 Pupils

	1951-4th Gr. Raw Score	1952-5th Gr. Raw Score	Gain Raw Score	Gain T-Score	Normal Diff. T-Score
Reading Vocabulary	46	52	6	3	6½
Reading Comprehension	10	15	5	9	6
Arithmetic Reasoning	11	21	10	13	8
Arithmetic Fundamentals	15	26	11	12	8½
Language	16	23	7	9	4
Spelling	6	10	4	6	6½
TOTAL	104	147	43	9½	7

Table 7-b

GROWTH BETWEEN GRADES 5 AND 6

Mean Scores — 20 Pupils

	1952-5th Gr. Raw Score	1953-6th Gr. Raw Score	Gain Raw Score	Gain T-Score	Normal Diff. T-Score
Reading Vocabulary	53	61	8	5½	4½
Reading Comprehension	16	21	5	7	4½
Arithmetic Reasoning	22	26	4	5½	5
Arithmetic Fundamentals	27	36	9	10	5½
Language	24	29	5	6	4
Spelling	10	14	4	5	4½
TOTAL	152	186	34	8	5½

Growth in Terms of National Norms. It is interesting to compute growth for the same group in terms of the published national norms of the California Test Bureau. This is shown in Table 7-c. It will be seen that if judgments for this group were made only on the basis of national norms it would appear that they had made normal progress only in language over the two-year period. On the other hand, when the area norms are used, as shown in Tables 7-a and 7-b, it can be seen that this group has equalled or exceeded normal progress in every case, with the single exception of reading vocabulary between grades four and five.

---

[5] The T-score gains shown in the tables were easily read from the elementary profile sheet by consulting the T-score columns on either side of the sheet. The normal differences between grades were read by superimposing both the fourth and fifth-grade overlays upon the profile sheet simultaneously and noting the T-score differences between the means (solid black lines). The same procedure was used with grades five and six in Table 7-b, by using the fifth and sixth-grade overlays on the profile sheet.

A Comparison of Growth As Measured by Area Norms and National Norms. Arranging the various parts of the battery and the total score in rank order, first in terms of area norms and then in terms of national norms, we find the differences shown in Table 7-d. Here is evidence that area norms and national norms are not comparable and cannot be used interchangeably.

Determining Levels of Achievement. The stratification of achievement of individuals by use of the grade means and standard deviations has already been described. By tallying each of the pupils of a group at the appropriate level and by computing percentages for each level, a meaningful comparison is obtained.

Table 7-c

GROWTH BETWEEN GRADES 4, 5, AND 6, EXPRESSED AS GRADE EQUIVALENT VALUES

(PUBLISHED NORMS OF THE C. A. T.)

	Read. Vocab.	Read. Comp.	Arith. Reas.	Arith. Fund.	Language	Spelling	Total
Grade Equiv. 1951 4th Gr.	3.2	3.7	3.7	4.1	3.5	3.9	3.7
Grade Equiv. 1952 5th Gr.	3.6	4.2	4.7	5.2	4.7	4.6	4.5
Grade Equiv. 1953 6th Gr.	4.4	4.9	5.4	6.0	5.5	5.4	5.3
Grade Equiv. gain between grades 4 & 6	1.2	1.2	1.7	1.9	2.0	1.5	1.6

Table 7-d

GROWTH BETWEEN GRADES 4 AND 5 BY SKILLS IN RANK ORDER

	Area Norms	National Norms
	1. Arithmetic Reasoning	1. Language
	2. Arithmetic Fundamentals	2. Arithmetic Fundamentals
	3. Total Score	3. Arithmetic Reasoning
Tie	4. Language & 5. Reading Comprehension	4. Total Score 5. Spelling
	6. Spelling	6. Reading Comprehension
	7. Reading Vocabulary	7. Reading Vocabulary

Again let us turn to the model study for an illustration of this technique, shown in Tables 7-e, 7-f, and 7-g. These tables deal with total score only. The fourth and fifth-grade groups used were both tested in 1952 and were composed of different children. The sixth-grade group, however, was tested in 1953 and was composed for the most part of the same children who were in the fifth-grade group in 1952. In all three tables all of the children at each grade level were included.

Upon examining Tables 7-e, 7-f, and 7-g, we observe a remarkable upward shift of achievement level at each successive grade level. Fifty-one percent of the fourth-graders were concentrated at the lowest level of achievement. There were no pupils at the superior level. This is not surprising, necessarily, inasmuch as the reservation is quite isolated and most children speak little English upon entering school. It is interesting, however, to note the steady reduction of percentages at the lower achievement levels and the building up of percentages at the higher achievement levels. Here is unmistakable evidence of growth.

The Program Has Continued

As was said earlier, the foregoing approach, techniques, and materials were used by the Evaluation Office and the University of Kansas consultants in an in-service training program for education personnel in the field. All three types of schools, Federal, public, and

Table 7-e

LEVELS OF ACHIEVEMENT
FOURTH GRADE — 1952 — 39 CASES

Total Raw Score	Number of cases	Percent of cases	Normal percent for Area
155 & up Superior	0	0	16 2/3
120 to 154 High Average	7	18	33 1/3
89 to 119 Low Average	12	31	33 1/3
88 & below Low	20	51	16 2/3

Table 7-f

LEVELS OF ACHIEVEMENT
FIFTH GRADE — 1952 — 30 CASES

Total Raw Score	Number of cases.	Percent of cases	Normal percent for Area
192 & up Superior	1	3 1/3	16 2/3
155 to 191 High Average	12	40	33 1/3
118 to 154 Low Average	10	33 1/3	33 1/3
117 & below Low	7	23 1/3	16 2/3

Table 7-g

LEVELS OF ACHIEVEMENT
SIXTH GRADE — 1953. — 29 CASES

Total Raw Score	Number of cases	Percent of cases	Normal percent for Area
222 & up Superior	2	7	16 2/3
182 to 221 High Average	12	41	33 1/3
144 to 181 Low Average	10	35	33 1/3
143 & below Low	5	17	16 2/3

mission, were serviced. It is gratifying to be able to report that the achievement testing program has been continued along these lines by all Federal schools in the Phoenix, Aberdeen, Billings, Anadarko, and Muskogee Areas and by a good many of the cooperating public and mission schools.

CHAPTER VIII

THE PREDICTIVE TESTING PROGRAM

PURPOSES OF THE PROGRAM

The general policy controlling educational loans to Indian students is stated as follows:

> "Loans to Indians for educational purposes may be made only if no other means of financing them is available. Such loans may be made by Indian chartered corporations, unincorporated tribes and bands, and credit associations. The United States, through the Bureau of Indian Affairs, also may make loans for educational purposes, but only to Indians who are not members of a corporation, tribe, or band which is conducting credit operations, and who are not eligible for loans from a credit association, unless an exception in a particular case is specifically authorized by the Commissioner. Indians applying for loans from the United States for educational purposes must be members of tribes which are being served by existing Area Offices."[1]

The specific reference to the use of tests in the granting of educational loans to Indians is in the following words:

> "Except as provided herein, all applicants for educational loans are required to take prescribed tests obtainable by authorized school officials from Haskell Institute, Lawrence, Kansas. Area or Agency education specialists will arrange for administering all tests required. At jurisdictions without such personnel, the Agency Superintendent may delegate a Reservation Principal, or Teacher, or other qualified employee to administer the tests strictly in accordance with the instructions accompanying test papers. Tests may be waived for students who have a high school grade average of B-plus or above, or who have completed a successful term in college."
>
> "If, in the opinion of the Area Director of Schools, the applicable high school testing program meets the standards of the Bureau testing program, the Bureau tests may be waived, and the official school record of all results shall be attached to the application."[2]

As was stated in Chapter II, one of the two principal undertakings of the education evaluation program was the planning and carrying out of a testing program which would satisfy the requirements of the provisions quoted above. There were several additional needs which would be met by such a testing program. First, other types of scholarship aid, such as working scholarships, grants in aid, and tribal scholarships, could be more wisely awarded if such test information was available. Second, Haskell Institute felt the need for such test data in granting admission to its Commercial Training Department. Third, even though the student was not seeking financial assistance, he and his advisors would often welcome such information as a help in deciding whether a post-high school course of academic training should be pursued.

The problem with which responsible officials are faced, whether they be of the Bureau of Indian Affairs or of the various tribal groups, is to make in advance an intelligent prediction as to whether a student is likely to succeed in the course which he wishes to pursue. Available funds are nearly always limited. Loans must be repaid. Students who lack the requisite aptitude for advanced academic study, whether in college, nurses' training, or a commercial course, often suffer a loss of time and money as well as frustration and disappointment.

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[1] Indian Affairs Manual, Vol. IV, Part VII, Chap. 12, Sec. 1201.

[2] Op. cit. Vol. IV, Part VII, Chap. 12, Sec. 1202.05.

Prediction of success or failure in academic study at the post-high school level is at best a difficult business since so many variables constitute the elements of success. Unquestionably, however. capacity to learn is one of these elements. An intense desire to succeed and willingness to work long and hard will go far toward compensating for low scholastic ability, but these diverse traits do not always exist together in the same person and, in any case, low scholastic ability remains as a negative factor. Nor is it simple to determine the academic aptitude of a student for advanced study. High school marks or "grades" provide a valuable index for this purpose but they have a serious limitation. Most schools grade a pupil largely by comparison with his classmates and with reference to the general achievement level of the school of which he is a member. This is good educational practice for intra-school purposes. However, since school and communities differ widely in educational attainment, pupil performance earning a mark of "A" in one school may not merit more than a "C" in another. Nor are achievement test scores ordinarily obtained in high school entirely satisfactory for predicting post-high school success, since they are usually related to the achievement of high school, not college, students.

PLANNING THE PROGRAM

The Test Battery

With the foregoing considerations in mind the conferees who met at Haskell Institute in December of 1950 agreed that the consultants at the University of Kansas would recommend a battery of tests believed to be valid for the purposes described. The Guidance Bureau of the University of Kansas would stock and distribute this battery, would score the tests, and report the results. It was also agreed that validative studies on the battery would be undertaken. It was further determined that a fifty-cent fee would be required of applicants taking the battery, partly to help defray the cost of processing the battery, and partly as evidence of interest and good faith on the part of the applicant in requesting the tests.[3]

Early in 1951 Dr. E. Gordon Collister proposed the following battery of tests to Dr. Willard W. Beatty and Mr. Earl C. Intolubbe and they approved it. (See Appendix E.) The battery:

Otis Quick-Scoring Test of Mental Ability (gamma)
Cooperative English Test (single booklet edition, lower level)
Cooperative General Achievement Test of Proficiency in Mathematics
Hundred-Problem Arithmetic Test (Schorling, Clark, and Potter)
The Guilford-Zimmerman Temperament Survey

The composition of the battery has not changed since it was first adopted. All of the tests are of the "paper and pencil" type and may be administered to groups or to individuals.

The **Otis test** yields a measure of general intelligence or mental ability expressed as an intelligence quotient. The **Cooperative English Test** is in two parts, English and reading. Each of these is subdivided: the English into mechanics of expression and effectiveness of expression, and the reading into vocabulary, speed, and comprehension sub-scores. The **Cooperative General Mathematics Test** has two parts, terms and interpretations, and also gives a total score. The **Hundred-Problem Arithmetic Test** measures skill in the four basic arithmetic operations and in fractions, decimals, and percents. It also yields a total score. **The Guilford-Zimmerman Temperament Survey** elicits from the individual, by responses to a series of questions, a description of his own temperament or personality.

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[3] In a letter dated February 16, 1953, the Evaluation Office notified school administrators that the fifty-cent fee would no longer be required of applicants for the battery of tests. General dissatisfaction with the fee requirement had been expressed by school officials. Collecting the money and transmitting it added to the administrative burden of giving the tests and slowed down the testing procedure. Early in 1953, upon the recommendation of the Evaluation Office, the Central Office authorized removal of the fee requirement.

The same battery was to be given to both college and commercial course applicants except for the mathematics test. College candidates were to be required to take the **Cooperative Mathematics Test** because it includes some algebraic and geometric material which the candidate would quite likely encounter in college. Commercial course applicants were to be given the **Hundred-Problem** test since it was felt that bookkeeping and accounting involve arithmetic skills almost exclusively.

Disseminating Information to the Field

On February 12, 1951, a letter went out from the Evaluation Office to all Area Directors of Schools advising them, in brief, of the main decisions reached at the December conference and promising that more detailed information on the predictive test battery would be forthcoming shortly. On February 27 this second communication went forward to the Area Directors of Schools. Copies of these letters appear in Appendix E. The several Area Directors of Schools relayed this information to the various agencies and schools under their jurisdiction and to public and mission schools enrolling Indian students. They also devised plans for administering the tests, taking into account the peculiarities of each area situation.

This phase of the testing program was actually launched when the University of Kansas began sending out batteries on about March 15, 1951.

Ordering and Administering the Battery

As will be noted in the letter of February 27, a form for use by the applicant in ordering the battery had been devised and reproduced in quantity. A supply of these was sent to each Area Director of Schools and he, in turn, distributed them in his respective area. The batteries were to be ordered directly from the Guidance Bureau of the University of Kansas. The Guidance Bureau would then mail the battery directly to the person named by the applicant, and approved by a school official, as the one taking the responsibility for administering the tests. This plan has been followed since. The application form currently in use appears in Appendix E. A manual of general and specific instructions for test administration was prepared by the Evaluation Office and a copy is included with the test battery when the Guidance Bureau ships the battery. As has been indicated, the tests are actually administered in the field by qualified school personnel who are under instructions to follow the directions faithfully.

Processing the Battery

When the applicant has completed the tests, the marked answer sheets and the other testing materials are returned to the Guidance Bureau. There the answer sheets are machine scored and the raw scores are converted into an I.Q., in the case of the **Otis test**; and into centile ranks in the case of the others. The test results are then recorded on a report sheet designed for the purpose. This report sheet and the explanation printed on its reverse side are shown in Figures VIII-1 and VIII-2 in this chapter. As will be seen in Figure VIII-1, both raw scores and centile ranks are reported, except that an I.Q. rather than a centile rank is shown in the case of the **Otis test**. Six copies of the report are prepared for each set of scores.

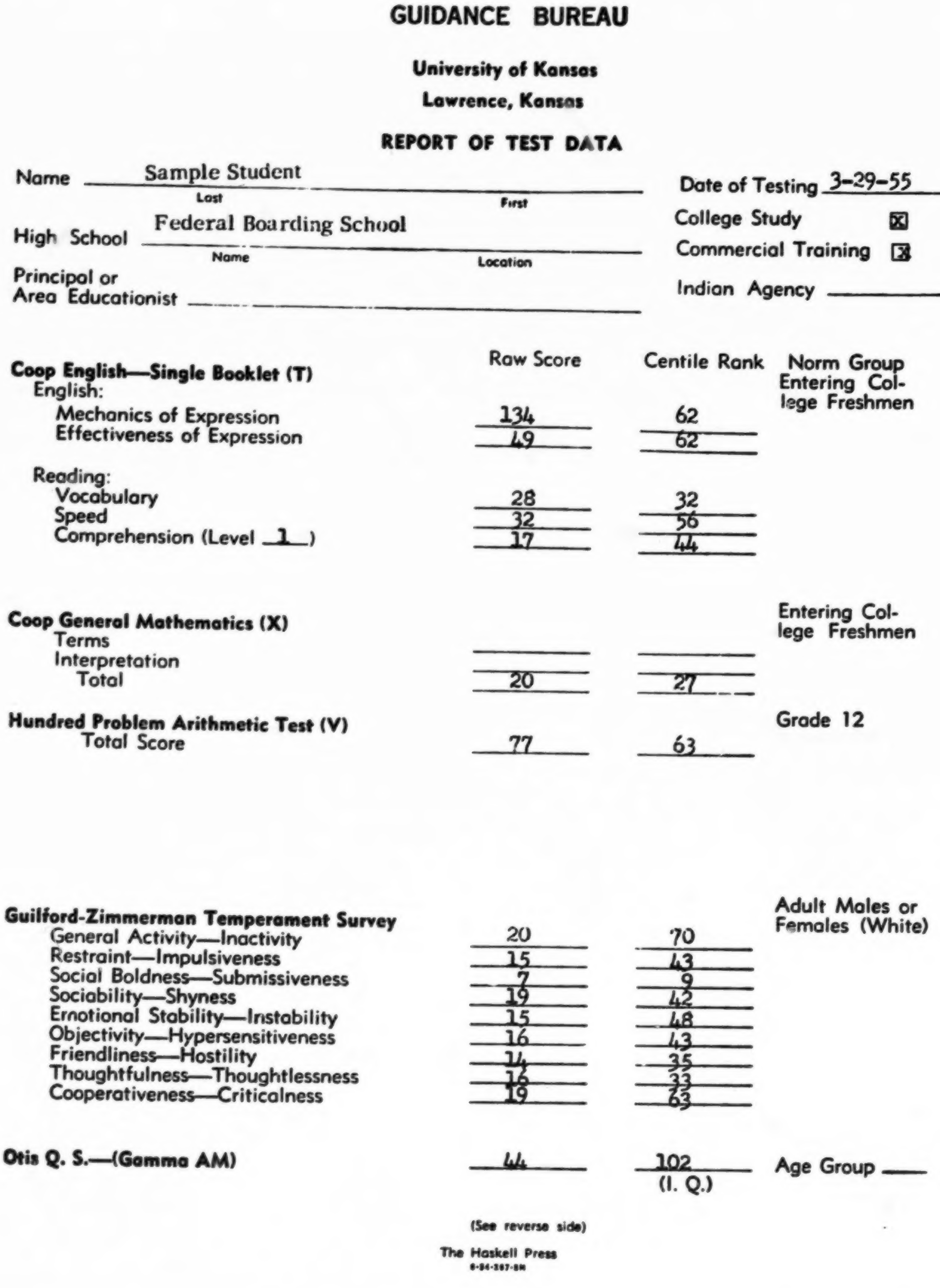
The Number of Students Taking the Battery

As of September 20, 1955, a total of 2,221 Indian students had applied for and taken the predictive test battery during the five-year life of the program. This group was almost evenly divided as between college and commercial applicants, exactly 1,100 being in the former category and 1,121 in the latter.

Distributing the Reports of Test Data

The Evaluation Office, because of its greater familiarity with the organizational

Figure VIII-1



GUIDANCE BUREAU

University of Kansas
Lawrence, Kansas

REPORT OF TEST DATA

Name Sample Student (Last) (First)

Date of Testing 3-29-55

High School Federal Boarding School (Name) (Location)

College Study ☒

Commercial Training ☒

Principal or Area Educationist

Indian Agency

	Raw Score	Centile Rank	Norm Group
Coop English—Single Booklet (T)			Entering College Freshmen
English:			
Mechanics of Expression	134	62	
Effectiveness of Expression	49	62	
Reading:			
Vocabulary	28	32	
Speed	32	56	
Comprehension (Level 1)	17	44	
Coop General Mathematics (X)			Entering College Freshmen
Terms			
Interpretation			
Total	20	27	
Hundred Problem Arithmetic Test (V)			Grade 12
Total Score	77	63	
Guilford-Zimmerman Temperament Survey			Adult Males or Females (White)
General Activity—Inactivity	20	70	
Restraint—Impulsiveness	15	43	
Social Boldness—Submissiveness	7	9	
Sociability—Shyness	19	42	
Emotional Stability—Instability	15	48	
Objectivity—Hypersensitiveness	16	43	
Friendliness—Hostility	14	35	
Thoughtfulness—Thoughtlessness	16	33	
Cooperativeness—Criticalness	19	63	
Otis Q. S.—(Gamma AM)	44	102 (I. Q.)	Age Group

(See reverse side)

The Haskell Press
8-94-387-8M

Figure VIII-2

EXPLANATION

The tests named on the face of this report attempt measurement in areas which are generally agreed to be important to academic success, namely; use of language, reading, mathematics, temperament, and mental ability.

Scores are also reported as centile ranks, in relation to the norm group on which each test was standardized. For example: If an applicant has a centile rank of 43 in Mechanics of Expression, we know that his score on this particular test was equal to or higher than that of 43% of a large group of entering college freshmen on whom the test was standardized. On the other hand, 57% of this group had scores higher than the applicant's. This affords some knowledge of the applicant's ability in comparison with other students of the sort with whom, presumably, he will soon be competing. All centile ranks are interpreted in this manner. In the case of the Hundred Problem Arithmetic Test, the norm group is composed of high school seniors; for the Guilford-Zimmerman Temperament Survey,white adult males and females from the general population; and for the Otis Mental Ability Test, the appropriate age group.

The reading comprehension score is reported for one of three levels. The level depends upon the number of items the applicant attempted. Level I may be regarded as the slow reading group, Level II as the average reading group, and Level III as the fast reading group. Centile rank of the applicant in reading comprehension, then, is based on scores of those students who read at approximately the same rate he does.

In the case of the Guilford-Zimmerman Temperament Survey, scores and centile ranks are reported on each of nine different traits. The higher the centile rank, the greater is the applicant's tendency to evaluate himself toward the upper or left hand side of the scale, as described on the face of this report. The Guilford-Zimmerman manual says, "In most cases the **optimal** scores do not extend to the top of the scale, but at some moderate position between the mean and the top."

Generally, however, one can predict with more confidence from extremely high or extremely low scores than from those which lie closer to the average of the group.

It is hoped that persons making decisions or recommendations affecting the granting of educational loans, admission to certain courses of study, etc., will consider data contained in this report as only a part, but an important and useful part, of the total information about the applicant which should be considered. School marks; study and work habits, ability to adjust socially, financial resources, and the attitude of the applicant and his family toward post high school education are, of course, some of the other considerations which must be taken into account, structure of the Bureau of Indian Affairs and the persons to whom test results should be sent, until recently has undertaken the distribution of the reports of test data. This function has now been assumed by the Guidance Bureau of the Univerity of Kansas. One copy is retained by the Guidance Bureau and one copy is sent to the Director of Schools of the applicant's area. A third copy is furnished to the applicant's agency and a fourth to the high school from which he is being, or has been, graduated. A fifth copy is placed in a permanent file in the Evaluation Office. If the applicant is a candidate for commercial training at Haskell Institute, a copy is supplied to that school.

INTERPRETING THE TEST RESULTS

The reader's attention is again invited to Figure VIII-1. The report sheet bears a set of scores actually obtained by a twelfth-grade student in one of the Federal boarding schools. They are not necessarily typical of the scores of other students, but they will serve well for purposes of illustration, particularly because this applicant took both mathematics tests.

The raw scores are important only to Haskell Institute which uses these in preparing a profile for each of its candidates as will be explained later in this chapter. The centile rank column provides the information which is useful in making decisions concerning college or nursing aspirants. The particular norm group, shown at the right hand side of the sheet, must be borne in mind however.

The norm groups for the **Cooperative English** and **Cooperative Mathematics** tests are composed of large numbers of entering college freshmen. Specifically, these college freshmen were enrolled in small colleges and teachers' colleges as distinguished from two other **Cooperative** norm groups: large private universities and those of the state university class. It had been observed that the majority of Indian students attend the smaller schools. The norm group for the **Hundred-Problem Arithmetic Test** is made up of twelfth-grade students and for **The Guilford-Zimmerman Temperament Survey** of adult white males and females from the general population. The I.Q. is derived by comparison with an appropriate age group from the general population.

An official charged with making a decision or recommendation in the case of the applicant shown in Figure VIII-1 would first read the explanation printed on the back of the report sheet and shown in Figure VIII-2. He would then be in a position to make certain judgments about this applicant's scores. He would observe that for the most part the applicant is not very far from the average of the norm group. On both of the English skills he is at the sixty-second percentile which means that his scores are equal to or better than sixty-two percent of entering college freshmen. Thirty-eight percent have scores better than his. Since nearly all regularly enrolled college students must take courses in rhetoric and composition, it is important to know how this student compares in English skills with others of the sort with whom, presumably, he will soon be competing. Apparently our student in Figure VIII-1 compares quite favorably. Proficiency in reading is important to success in college, for college students are required to do a great volume of reading and to understand what they read. Our applicant in Figure VIII-1 does not stand quite so favorably in his reading skills. He is at Level 1 which indicates that he did not attempt a large number of items. His percentile scores of fifty-six in speed and forty-four in comprehension indicate, however, that he is close to the average for those students who read at about his rate. He is lowest in vocabulary in which sixty-eight percent of entering college freshmen excel him.

He is higher than only about one-fourth of entering college freshmen in general mathematics, but excels nearly two-thirds of high school seniors in arithmetic skills. This is explainable on the basis that his high school may not have offered, or he may not have taken, advanced courses in algebra or geometry. It does not remove the probability, however, that he will have some difficulty with college algebra or trigonometry.

On the temperament survey his responses indicate he lacks social boldness but is above average in general activity and cooperativeness. He feels that he is somewhat below average in friendliness and thoughtfulness, but about average on the other traits.

His obtained I.Q. was 102 which is about average for the general population but probably somewhat lower than the average for entering college freshmen who are, by one means or another, a selected group.

The official might reasonably conclude that the picture is, on the whole, not a bad one so far as academic aptitude is concerned and that the applicant merits consideration for some financial assistance in trying for college education. The scores certainly do not guarantee his success, but it appears that if other factors are favorable this applicant might well succeed in college.

Two points need to be emphasized here. First, comparing the applicant with a group of entering college freshmen is quite different from comparing him with his high school classmates who live in the same community with him. Second, as is stressed in the last paragraph of the explanation in Figure VIII-2, the test scores are only one useful part of the total information about the applicant which is needed to make an intelligent decision.

Both the University of Kansas and the Evaluation Office of the Bureau have always abstained from making recommendations in individual cases concerning the granting or denying of loans or admission to certain courses of study. They have believed their responsibility to be the furnishing of objective test data, in meaningful form, to the persons charged with the responsibility for making such decisions, and, whenever possible, to instruct these persons in the techniques of interpreting such data.

VALIDATION OF THE PREDICTIVE BATTERY

There has been no opportunity up to this time to conduct any follow-up study of college loan applicants. Thus, there is no objective information available which could be used to determine the usefulness of the test battery in predicting what may be very generally called "success in college." A discussion of the validity of the test battery for predictive purposes must be restricted to the work which has been done with applicants to, and students of, the Haskell Commercial Department.

Selection of a Criterion

In order to predict "success in training" there must be some measure of success, commonly called a criterion. A number of criteria were suggested:

1. Passing a civil service examination in the field of training.
2. Obtaining a position which could not have been obtained without training.
3. Making average or better grades while in training.
4. Completing training.

School personnel at Haskell Institute desired to make use of the test battery as early as possible, i.e., for aid in the selection of commercial students for the school year 1951-52. Consequently, there was little time available to make an exhaustive follow-up study of commercial graduates. Such information could have made the use of the first two criteria possible, but it was not possible to obtain it in such a short time. The third criterion of teachers' grades was recognized as being traditionally unreliable and so its use as a single criterion was not made. The criterion of completion of training was used, but in a modified form as will be explained below.

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[4] The use of a predictive battery as an aid in selection before it has been thoroughly validated was clearly seen as a complicating factor in the validation procedure.

Early in the spring semester of 1951 the test battery was administered to students in both years of the commercial course. The training program was viewed as a selective process in which the poorer students in this field were gradually weeded out. Thus one might expect that senior students would score higher than junior students on most of the tests, especially since they had the advantage of an extra year of training. Such was not the case, however. The average score of the forty-four seniors did not differ except within the limits of chance variation from the average score of the sixty-six juniors, with but two exceptions: mechanics of English and the subtraction subtest of the arithmetic test. The seniors scored higher, on the average, on both of these. Commercial department teachers agreed that practically all students who successfully completed the first year of training likewise successfully completed the second year if they returned to take it. Also, most of the students who would fail in the training program would have been dropped by the second semester of the junior year when the tests were administered. Thus it was felt that for the purpose of a convenient criterion with this battery of tests successful completion of the first year of training could be considered equivalent to successful completion of both years.[5] This was not intended to imply that the senior year in the department provided no increment in learning for the commercial students. But since the tests in the battery were not designed to measure the specific objectives of the Haskell commercial program, they might not reflect any real differences which could develop in commercial skills between the seniors and juniors as a result of training.

Validative Studies

The Original Student Profile. Investigation up to this point left unanswered questions with regard to how the successful commercial students differed from unsuccessful ones on their test scores. In the meantime the battery was being administered to applicants for admission to the Haskell Commercial Department. A temporary individual profile sheet, shown as Figure VIII-3, was prepared, using the score distributions for sixty-seven first-year students. This profile sheet showed the raw score equivalents for the average score and plus-and-minus one and two standard deviations from the mean for the group on each test. The mean line and plus-and-minus one standard deviation lines for the eighteen lowest achieving students in the group were drawn on a sheet of transparent acetate material. The acetate sheet was then superimposed on the profile and a graphic picture was provided of a candidate's performance in relation to the mean of the lowest group of eighteen students in the first year of the commercial course. Very loosely this mean line was used as a "cut off line" below which the prognosis for success of the applicant was not considered good. No harsh or abitrary decisions were made on the basis of this alone. All other information about a candidate was utilized including, of course, his high school transcript. The technique, which has been described, was utilized simply as a guidance tool. Some students whose scores were below the line, were accepted on the basis of ameliorating information. The commercial staff reported a rather marked decline the following year both in the number of drop outs and in the incidence of maladjusted pupils.

The Ferguson Study. An intensive validation study was conducted by William A. Ferguson in 1952.[6] He analyzed the test scores of applicants to the commercial program for the fall of 1951. He then compared the results of those who were accepted for that school year with the results of those who completed the academic year. There were 187 who took the test battery, of whom 101 were accepted for admission (although not all of these matriculated), and fifty-four successfully completed the first year of training.

As a basis for comparison, the frequency distributions for the tests of all 187 applicants were used. Centile rank equivalents for each raw score were obtained and raw scores were converted into normalized standard scores having a mean of 50 and a standard devia-

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[5] E. Gordon Collister, Kenneth E. Anderson, and Donald K. Ottman. Prediction of Success in the Commercial Program at Haskell Institute. (Unpublished report, Kansas University, 1951.)

[6] William A. Ferguson. An Analysis of the Test Scores of Applicants to the Commercial Program at Haskell Institute. (Unpublished master's thesis, University of Kansas, 1952.)

Figure VIII-3

STUDENT PROFILE

CIT VOC.	CIT SPEED	BI EFFECT.	A MECH. OF EXP.	OTIS (GAMMA)		ARITHMETIC PARTS				TOTAL
					I	II	III	IV	V	
60 56	78			62					43	90
51 46 41	68 63 58 48 43	66 60	162 157 152 147	57 52	10	10	15	15 14	38	85 80 75
		55					14		33	
36 31	38 33	50 45	142 137 132	47 42	9	9	13	13 12	28 23	70 65 60
	28	40	127	40	8			11		
26 21	23 18	35 30	122 117 112 107	37 32	7 6	8 7	12 11 10 9	10 9 8 7 6	18 13	55 50 45 40
16								5		35
11 6	13	25 20 15	102 97 92 87	27 22	5 4 3 2	6 5 4	8 6 5 4	3 2	8 7	30 25 20
		10	82							
					1	1	3 2	1		15

tion of 10. Thus, since the same individuals were administered the entire battery, the scores on all tests were rendered comparable. To further simplify the handling of data on IBM processing machines, and as an aid in classifying students, a sten scale (standard scale of ten units) was devised for the normalized distributions. The sten scale ranges from a low score of 0 to a high score of 9. It has an average score of 4.5 and a standard deviation of 1.6667 sten score units.[7] The upper and lower raw score limits for each sten score on each test were found and this information was used in constructing a new individual profile sheet. This profile sheet is shown as Figure VIII-4. It was used at Haskell Institute as an aid in selection for the next two years.

Ferguson compared the average score on each test of 142 applicants with the average score of forty-five who took the tests but did not apply for admission. He found statistically significant differences in favor of the applicants on every test except the **Otis Test of Mental Ability** where no difference was obtained. The same procedure was used to test the differences between the average scores for the applicants and the average scores for those who successfully completed the first year of training. For the most part the means between these two groups were not **significantly** different. The average scores on the aptitude and achievement tests were without exception slightly higher for the successful group than they were for the accepted group, however. Ferguson concluded that the lack of differences between the scores of accepted and successful students indicated that students dropped out of training for reasons not measured by the battery. But he did develop transparent acetate overlay sheets for each of the above two groups, showing the mean and plus-and-minus one standard deviation from the mean, so that an individual's profile could be compared to them.

Construction of Current Norms. In the spring of 1954 Ralph E. Kron gathered together all of the test results of Haskell commercial applicants from the beginning of the program through March 31, 1954. There were test scores for 566 applicants (408 females and 158 males) for the battery over the three-year period. The same procedure that Ferguson used was applied to these data. Raw score frequency distributions were made, centile ranks were derived, and a conversion to normalized T-scores was made for each distribution. The limits of sten scores were then obtained. Intercorrelations of the test scores of the 408 females in this population are shown in Appendix E. Two samples, one of one hundred females and the other of one hundred males, were drawn at random for a study of the reliability of these tests for this population. Appendix E shows the standard error of measurement and the reliability coefficient for each sex on each test of the battery.

A new individual profile sheet, shown as Figure VIII-5, was constructed, based on the larger population of applicants for the battery. The only major format change from Ferguson's profile sheet was that only the total arithmetic score was scaled, rather than including all of the arithmetic subtests in addition to the total score. An important addition to the usefulness of the profile sheet for interpretation purposes was made. This was the printing on the profile sheets of the average profile made by a "pass" group of 218 students who had completed at least one year of training, as well as the average profile for a "fail" group of forty-five students. The range of scores between plus-and-minus one standard deviation from the mean score was shaded in blue for the pass group and in red for the fail group.

An interesting phenomenon was noted when pass and fail group raw score points on the tests, for the mean and plus-and-minus one standard deviation (S.D.) from the mean were compared. For all the tests except **The Guilford-Zimmerman** scales, the average score for the pass group approximated the value for plus 1 S.D. for the fail group, while minus 1 S.D. for the pass group approximated the average score for the fail group. The profile sheet then appeared to be fairly neatly divided into five levels:

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[7] This method of obtaining derived scores was suggested by Donald K. Ottman. It is a slight revision of the Canfield sten score scale. Cf. Canfield, A. A. The "Sten" Scale—A Modified C Scale, **Educational and Psychological Measurement**, XI (1951), Summer, 295-297.

Figure VIII-4

STUDENT PROFILE
HASKELL COMMERCIAL APPLICANTS

NAME ______________________ HIGH SCHOOL ______________________ DATE ____________

STEN	COOP ENGLISH (C.T.)									HUNDRED PROBLEM ARITHMETIC						GUILFORD-ZIMMERMAN TEMP. SURVEY											T
SCORE	OTIS I.Q.	MECH of EXP.	EFF of EXP.	VOC.	SPEED	READ COMP. I	READ COMP. II	READ COMP. III	T READ	ADD.	SUB.	MULT.	DIV.	FRAC.	T READ	GEN. ACT.	REST.	ASCEN.	SOCIA.	EMO. STAB.	OBJ.	FRIEND	THOUGHT	PERS. REL.	M.	F.	SCORE
9	122	162	69	52	69				205					46	96	28	27	26		28	26	28	27	28		3	75
8	121 116	161 153	68 60	51 48	68 48	21	45	69	204 195				15	45 44	95 92	27 24	26 24	25 24	28	27 26	25 25	27 26	26 26	27 25	26	4 4	74 69
7	115 110	152 141	59 54	47 40	47 36	20 19	44 39	68 66	194 165			15	14 14	43 38	91 84	23 22	23 22	23 20	27 25	25 24	24 23	25 24	25 24	24 23	25 25	5 6	68 63
6	109 102	140 131	53 45	39 32	35 30	18 16	38 33	65 48	164 150	10	10	14 14	13 12	37 28	83 68	21 19	21 19	19 17	24 23	23 21	22 20	23 19	23 22	22 20	24 23	7 8	62 57
5	101 96	130 112	44 33	31 24	29 21	15 12	32 27	47 36	149 135	9 9	9 9	13 12	11 10	27 18	67 56	18 16	18 16	16 14	22 20	20 17	19 16	18 16	21 19	1[illegible] 16	22 20	9 10	56 5[illegible]
4	95 88	111 94	32 24	23 14	20 15	11 7	26 21	35 27	134 120	8 7	8 8	11 9	9 6	17 10	55 40	15 13	15 14	13 10	19 16	16 13	15 12	15 13	18 16	15 13	18	11 13	50 45
3	87 84	93 78	23 15	13 8	14 6	6 4	20 9	26 21	119 95	6 5	7 6	8 6	5 4	9 4	39 28	12 10	13 11	9 8	15 12	12 9	11 9	12 9	15 12	12 12	17 15	14 15	44 39
2	83 78	77 54	14 6	7 2	5 3	3 1	8 6	20 18	94 70	4 3	5 5	5 4	3 2	3 2	27 20	9 7	10 9	7 5	11 8	8 7	8 7	8 6	11 10	11 9	14 10	16 19	36 33
1	77 74	53 27	5 3	1 0	2 0	0 0	5 3	17 12	69 55	2 1	4 4	3 2	1 0	1 0	19 16	6 4	8 7	4 3	7 6	6 4	6 4	5 3	9 7	8 6	9 7	20 21	32 27
0	73	26	2				2	11	54	0	3	1			15	3	6	2	5	3	3	2	6	5	6	22	26

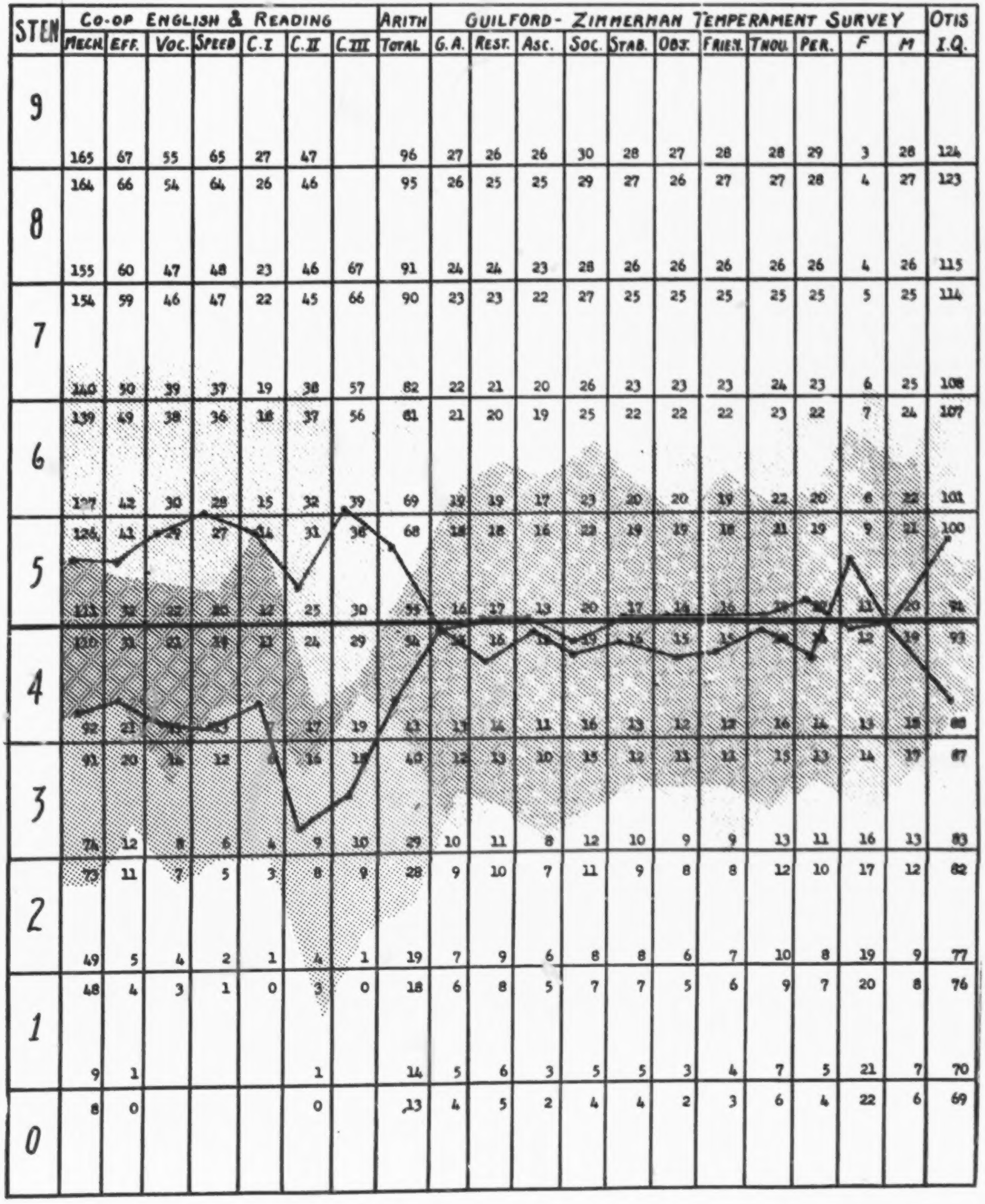
PREPARED BY THE GUIDANCE BUREAU, UNIVERSITY of KANSAS - 1952

Figure VIII-5

HASKELL COMMERCIAL APPLICANT PROFILE

BASED ON 566 APPLICANTS 1951-1954

NAME ______________ HIGH SCHOOL ______________ DATE ________



STEN	CO-OP ENGLISH & READING							ARITH	GUILFORD-ZIMMERMAN TEMPERAMENT SURVEY											OTIS
	MECH.	EFF.	VOC.	SPEED	C.I	C.II	C.III	TOTAL	G.A.	REST.	ASC.	SOC.	STAB.	OBJ.	FRIEN.	THOU.	PER.	F	M	I.Q.
9	165	67	55	65	27	47		96	27	26	26	30	28	27	28	28	29	3	28	124
8	164	66	54	64	26	46		95	26	25	25	29	27	26	27	27	28	4	27	123
	155	60	47	48	23	46	67	91	24	24	23	28	26	26	26	26	26	4	26	115
7	154	59	46	47	22	45	66	90	23	23	22	27	25	25	25	25	25	5	25	114
	140	50	39	37	19	38	57	82	22	21	20	26	23	23	23	24	23	6	25	108
6	139	49	38	36	18	37	56	81	21	20	19	25	22	22	22	23	22	7	24	107
	127	42	30	28	15	32	39	69	19	19	17	23	20	20	19	22	20	8	22	101
5	126	41	29	27	14	31	38	68	18	18	16	22	19	19	18	21	19	9	21	100
	113	32	22	20	12	25	30	55	16	17	13	20	17	14	16	20	[illegible]	11	20	94
4	110	31	21	19	11	24	29	54	[illegible]	16	[illegible]	19	16	15	15	[illegible]	[illegible]	12	19	93
	92	21	[illegible]	[illegible]	7	17	19	41	13	14	11	16	13	12	12	16	14	13	15	88
3	91	20	16	12	6	16	18	40	12	13	10	15	12	11	11	15	13	14	17	87
	74	12	8	6	4	9	10	29	10	11	8	12	10	9	9	13	11	16	13	83
2	73	11	7	5	3	8	9	28	9	10	7	11	9	8	8	12	10	17	12	82
	49	5	4	2	1	4	1	19	7	9	6	8	8	6	7	10	8	19	9	77
1	48	4	3	1	0	3	0	18	6	8	5	7	7	5	6	9	7	20	8	76
	9	1				1		14	5	6	3	5	5	3	4	7	5	21	7	70
0	8	0				0		13	4	5	2	4	4	2	3	6	4	22	6	69

1. Scores greater than plus 1 S.D. of the pass group.
2. Scores greater than the mean of the pass group or plus 1 S.D. of the fail group, but less than plus 1 S.D. of the pass group.
3. Scores greater than minus 1 S.D. of the pass group or the mean of the fail group, but less than the mean of the pass group or plus 1 S.D. of the fail group.
4. Scores greater than minus 1 S.D. of the fail group but less than the mean of the fail group or minus 1 S.D. of the pass group.
5. Scores less than minus 1 S.D. of the fail group.

Raw score limits for these five levels were set up. Expectancy tables for passing and failing were then constructed by calculating the percent of those scoring at each level who either passed or failed. Such tables can be of great use as an aid in the selection of students who stand the greatest chance for success in the program. (See Appendix E.)

Several attempts have been made to assign weights to various of the test scores in order to increase their ability to discriminate between various criterion groups. To date none of the weighting procedures has been successful but work is continuing along this line of research.

Investigation of Personality Traits. A few studies have been made in the Haskell Institute Commercial Department of the personality factors involved in success in training there. There were a few differences in temperament traits between the junior and senior women in the spring of 1951, as measured by **The Guilford-Zimmerman Temperament Survey** (GZTS). The junior women scored significantly higher on the average in the traits of emotional stability, general activity, and friendliness, and they approached a significantly higher average score in sociability. Mrs. Louise L. Baker, who was head of the Haskell Institute Commercial Department for nineteen years, was greatly interested in this phase of the testing program. She found that the median scores on the GZTS of eleven drop-outs from the 1950-51 program were considerably more in the direction of hypersensitiveness and intolerance than the average scores of students in the 1951-52 program. The same conclusions were true for fourteen drop-outs in 1951-52. In addition they seemed to be more submissive, shy, and belligerent. The twenty-two drop outs for 1952-53 were more impulsive, emotionally unstable, hypersensitive, and intolerant. Mrs. Baker compared the median scores of eighteen drop outs and students receiving failing grades with the median scores of the twenty students who received the earliest job appointments of the 1952 graduating class. The drop outs were found to be considerably more belligerent, intolerant, and impulsive than those who received early job appointments.[8] Further study is now under way in this area in an effort to throw more light on the motivational factors involved in the drop out problem of students who appear to be qualified for success in the program but who do not remain to complete all of the work.

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[8] Louise L. Baker. **The Testing Program for Selection of Haskell Commercial Enrollment.** (Unpublished report, Haskell Institute Commercial Department, 1953.)

APPENDIX A

List of Schools Participating in the Study

Manual of Instructions for Test Administration

Background Information Sheet

LIST OF SCHOOLS PARTICIPATING IN THE STUDY

PHOENIX AREA

Federal Schools

1. Blackwater Day School
2. Bylas Day School
3. Casa Blanca Day School
4. Chuichu Day School
5. Cibecue Day School
6. Colorado River Day School
7. Gila Crossing Day School
8. Hopi High School
9. Hotevilla Day School
10. Keams Canyon Boarding School
11. Kerwo Day School
12. Maricopa School
13. Phoenix Indian School
14. Pima Central Day School
15. Polacca Day School
16. Salt River Day School
17. San Carlos Day School
18. Santa Rosa Boarding School
19. Santa Rosa Ranch
20. Santan Day School
21. Sells Consolidated Day School
22. Shungapovi Day School
23. Theodore Roosevelt Day School
24. Toreva Day School
25. Vamori School
26. Vaya Chin Day School

Mission Schools

1. Cibecue Mission School
2. Covered Wells Mission School
3. East Fork Mission School
4. Evangelical Lutheran Mission School
5. Hopi Mission School
6. Our Lady of Guadalupe Mission School
7. Our Savior Mission
8. Peridot Mission School
9. Sacred Heart Mission School
10. St. Anthony Mission School
11. St. Joe San Miguel Mission School
12. St. Johns Mission School
13. St. Peters Mission School
14. San Jose Mission School (Tuscon, Ariz.)
15. San Jose Mission School (Ajo, Ariz.)
16. San Xavier Mission School

Public Schools

1. Fort Thomas Public School
2. McNary Public School
3. North Yuma Union Public School
4. Parker Public School
5. Picacho Public School
6. Poston Public School
7. Rice Public School
8. Sacaton Public School
9. San Taos Public School
10. Sells Indian Oasis Public School
11. White River Public School
12. Yuma Ado Public School

ALBUQUERQUE AREA

Federal Schools

1. Acomita Day School
2. Albuquerque Indian School
3. Cochiti Day School
4. Consolidated Ute Boarding School
5. Elk Silver Day School
6. Isleta Day School
7. Jemez Day School
8. Jicarilla Boarding School
9. Laguna Day School
10. McCarty Day School
11. Mescalero Day School
12. Nambe Day School
13. Paguate Day School
14. Paraje Day School
15. San Felipe Day School
16. San Ildefonso Day School
17. Sandia Day School
18. Santa Ana Day School
19. Santa Clara Day School
20. Santa Domingo Day School
21. Santa Fe Boarding School
22. Seama Day School
23. Taos Day School
24. Tesuque Day School
25. Ute Boarding School
26. Whitetail Day School
27. Zia Day School
28. Zuni Day School

Mission Schools

1. Allison and James Mission School
2. Dutch Reform Mission School
3. Our Lady of Sorrows Mission School
4. St. Anthony Mission School
5. St. Catherine Mission School
6. San Diego Mission School

Public Schools

1. Bernadillo Public School
2. Bluewater Public School
3. Bosque Farms Public School
4. Cubero Public School
5. El Gerro Public School
6. El Morro Public School
7. Espanola Public School
8. Fence Lake Public School
9. Flurospar Public School #21
10. Flurospar Public School #27
11. Grants Public School
12. Ignacio Public School
13. Los Lumos Public School
14. Marquez Public School
15. Peralta Public School
16. Pojoaque Public School
17. Ruidoso Public School
18. San Juan Public School
19. San Mateo Public School
20. San Rafael Public School
21. Seboyeta Public School
22. Tome Public School
23. Valencia Public School

ABERDEEN AREA

Federal Schools

1. American Horse Day School
2. Bear Creek Day School
3. Beaver Creek School
4. Becker Day School
5. Big Coulee Day School
6. Black Pipe Day School
7. Bridger Day School
8. Bullhead Day School
9. Charging Eagle School
10. Cherry Creek Day School
11. Cheyenne River Boarding School
12. Dunseith Day School
13. Elhowoods Community Boarding School
14. Enemy Swim Day School
15. Flandreau Boarding School
16. Fort Thompson Day School
17. Fort Totten Boarding School
18. Fort Yates Community School
19. Four Bear Day School
20. Great Walker Day School
21. Green Grass Day School
22. He Dog Day School
23. Houle Day School
24. Independence School
25. Iron Lightening Day School
26. Kenel Day School
27. Little Eagle Day School
28. Little Wound Day School
29. Loneman Day School
30. Long Hollow Day School
31. Lower Brule Day School
32. Lucky Mound School
33. Macy Day School
34. Moreau River Day School
35. Nishu School
36. No. 4 Day School
37. No. 6 Day School
38. No. 7 Day School
39. No. 9 Day School
40. No. 10 Day School
41. No. 16 Day School
42. Old Agency Day School
43. Oglala Community Boarding School
44. Pierre Indian Boarding School
45. Red Butte School
46. Red Scaffold Day School
47. Red Shirt Table Day School
48. Ridgeview School
49. Rosebud Boarding School
50. Roussin Day School
51. Sac and Fox School
52. Shell Creek School
53. Slim Butte Day School
54. Standing Rock Boarding School
55. Thunder Butte Day School
56. Turtle Mountain Community Day School
57. Wahpeton Boarding School
58. Wanblee Day School
59. White Horse Day School

Mission Schools

1. Holy Rosary Mission School
2. Immaculate Conception Mission School
3. Little Flower Mission School
4. Lutheran Parochial Mission School
5. Our Lady of Lourdes Mission School
6. Red Shirt Table Mission School
7. Sacred Heart Mission School
8. St. Augustine Mission School
9. St. Bernard Mission School
10. St. Francis Mission School
11. St. Philomena Mission School
12. Tekakwitta Mission School

ABERDEEN AREA

Public Schools

1. Agency Public School
2. Batesland Public School
3. Bloom Public School
4. Bob Callies Public School
5. Buffalo County Public School
6. Cannon Ball Public School
7. Carlin Public School
8. Center Public School
9. Demmer Public School
10. Denby Public School
11. Dunseith Public School
12. Dupree Public School
13. Eagle Butte Public School
14. Fairfield Public School
15. Fairview Public School
16. Faith Independent Public School
17. Fee Public School
18. Glad Valley Public School
19. Happy Hollow Public School
20. High Point Public School
21. Hill Top Public School
22. Hoxing Public School
23. LaPlant Public School
24. Leebelt Public School
25. McIntosh Public School
26. McLaughlin Public School
27. Main Public School
28. Manderson Public School
29. Minnewaukan Public School
30. Mission Public School
31. Morristown Public School
32. Mud Butte Public School
33. Oglala Public School
34. O'Kreek Public School
35. Pine Ridge Public School
36. Pourier Public School
37. Redelm Public School
38. Reis Public School
39. Rolla Public School
40. Roosevelt Public School #51
41. Rosebud Public School
42. St. Francis Public School
43. St. John Public School
44. Selfridge Public School
45. Sioux Rural Public School
46. Sisseton Public School
47. Smee District
48. Spring Creek Day School
49. Thunderhawk Public School
50. Tip Top Public School
51. Tokie Public School
52. Todd County High School
53. Van Dusen Public School
54. Wahpamni Public School
55. Wakpala Public School
56. Walthill Public School
57. Watauga Public School
58. White River Public School
59. White Swan Public School
60. Wilson Public School
61. Winnebago Public School
62. Zetgler Public School #85

BILLINGS AREA

Federal Schools

1. Birney Day School
2. Cut Bank Boarding School
3. Parker Day School
4. Rocky Boy's Day School
5. Sangrey Day School
6. Tongue River Boarding School
7. Wind River Day School

Mission Schools

1. Ashland Mission School
2. St. Charles Mission School
3. St. Labre Mission School
4. St. Michael's Mission School
5. St. Paul Mission School
6. St. Stephen's Mission School
7. St. Xavier Mission School

Public Schools

1. Arapaho Public School
2. Beaver Creek Public School
3. Browning Public School
4. Cold Feet Public School
5. Crow Agency Public School
6. Crowheart-Burris Public
7. Dubois Public School
8. Fort Washakie Public School
9. Glacier County (Babb) Public School
10. Glacier Park Public School
11. Hays Public School
12. Hudson Public School
13. Kirkaldie Public School
14. Lincoln Elementary (Harlem Elementary) Public School
15. Lodge Grass Public School
16. Lodge Pole Day School
17. Lower Mill Creek Public School
18. Mad Plume Public School
19. Morton Public School
20. Pavillion Public School
21. Pryor Public School
22. St. Xavier Public School
23. Starr Public School
24. Upper Mill Creek Public School
25. Wind River Public School
26. Winkleman Dome Public School
27. Wyola Public School
28. Zortman Public School

MUSKOGEE AREA

Federal Schools

1. Bogue Chitto Day School
2. Bogue Homo Day School
3. Chitimacha Day School
4. Conehatta Day School
5. Pearl River Day School
6. Red Water Day School
7. Seneca Boarding School
8. Sequoyah Boarding School
9. Standing Pine Day School
10. Tucker Day School
11. Wheelock Boarding School

Public Schools

1. Eufaula Public Schools
2. Goodland Public School
3. Hartshorne Public School
4. Jay Public School
5. Locust Grove Public School
6. Muldrow Public School
7. Vian Public School

ANADARKO AREA

Federal Schools

1. Cheyenne-Arapaho Indian School
2. Chilocco Indian School
3. Fort Sill Indian School
4. Haskell Institute
5. Pawnee Indian School
6. Riverside Indian School

Public Schools

1. Alden Public Schools
2. Boone Public School
3. Cache Public School
4. Calumet Public School
5. Camp Creek Public School
6. Carnegie Public School
7. Elgin Public School
8. Fort Cobb Public School
9. Verden Public School

Grades 4 through 12

Education
1951 Fall Testing Program
Office of Indian Affairs

MANUAL OF INSTRUCTIONS
FOR
TEST ADMINISTRATION

Purpose

The 1951 fall testing program marks the beginning of a new phase of evaluation in Indian education. The program this year is being concentrated in the Albuquerque and Phoenix areas and will, to some extent, serve as a pilot study. It is expected that the program will be extended to other areas in succeeding years, with the benefit of procedures worked out in this year's study.

One of the aims of the program is to provide the education branch with data by means of which it can evaluate progress toward its educational goals.

Another, and equally important, aim is to provide administrators, supervisors, and teachers in the field with data about children which will be useful in the instruction and guidance of those children.

It should be understood that the items in the tests do not constitute a list of facts or skills that should be mastered by all pupils in the Indian schools. These do not in any sense constitute an approved course of study.

It should also be understood that *it is not the purpose of the testing program to rate the efficiency of any teacher nor to judge the quality of instruction in any school*.

Schools Participating

It is planned that all Indian Service schools in the Albuquerque and Phoenix areas, with the exception of a few schools remote from the area headquarters, will participate in the program. In addition, testing will be carried on in a number of selected public and mission schools in each area. This cooperative arrangement has been worked out in order to provide a basis for comparative studies among the three types of schools enrolling Indian children of similar cultural background.

Grades to be Tested

All pupils in grades 4 through 12, in the schools participating, will be tested.

Tests to be Used

The California Achievement Tests (complete battery) have been selected for use this year. This confines the testing to the area of basic skills: reading, arithmetic, and language.

The California Achievement Tests are prepared for three levels: Elementary including grades 4, 5, and 6; Intermediate, including grades 7, 8, and 9; and Advanced, including grades 9 through 14. It will be noted that there is a year of overlap, involving the 9th grade, between the Intermediate and Advanced levels. It has been determined that *all 9th grade pupils will be given the Intermediate level*.

Who Will Give the Tests?

The tests will be administered by *trained teams of test administrators* appointed by the directors of education of the respective Indian Service areas. It is expected that the *teacher* of the pupils being tested *will be present in the room while the testing is in progress*.

It is also expected that pupils will be tested at their own schools and, if possible, in their own school rooms.

Members of the testing teams will prepare themselves by studying both the testing manuals and the tests themselves until they are thoroughly conversant with them.

The Background Information Sheet

The Background Information Sheet is not a test but is designed to provide information about a pupil which will be helpful in interpreting his test scores. The front side of the sheet may be filled out by the pupil with the teacher's help, or the pupil may be asked to provide only such information as the school records cannot supply. The back side of the sheet must be filled out by school officials who will refer to the school records. Specific instructions for the front side of the sheet appear later in this manual. Specific instructions for the back side of the sheet are printed on the sheet itself.

(Note: In case the school is a boarding-day school, the school, in the case of an individual pupil, should be considered *either* boarding or day, depending upon whether the individual pupil is a boarding or day pupil.)

Persons in charge of test administration are urged to see that these sheets are filled out *in advance of the testing date* in order that this operation will not infringe upon the testing time itself.

The Sample Questions

Since the tests in this year's program are to be machine scored, pupils tested will be required to mark their answers on a separate answer sheet. This involves an additional operation for the pupil and to most of the children it will be a new experience.

In order to minimize any adverse effects of this factor on the test results, a sample question and answer sheet has been prepared for the purpose of practice.

These sheets may be used in advance of the testing date or immediately before the testing begins. There is no limitation upon the amount of help a pupil may have in understanding the *technique of marking* the answer sheet. *In no case, however, is the pupil to be given help in deciding which is the correct answer once the actual testing has begun*.

Specific instructions for using the sample questions appear later in this manual.

Conditions of Administration

1) The room in which the testing is done should have a blackboard available.

2) The room should be large enough so that students may be spaced without crowding. It is desirable to have a desk intervene between pupils.

3) Each student should be provided with a comfortable chair and a desk on which he can write.

4) The test administrator should have a watch or clock to which to refer.

5) When a student has finished he should sit quietly until the entire group is ready to proceed or to be dismissed.

6) Do not attempt to test more than 30 or 40 children at one time. The number should be smaller with younger pupils.

The Testing Schedule

No attempt will be made to set up in this manual a rigid schedule for administering the tests. However, there are some basic considerations which should be adhered to:

1) The entire battery should be administered on the same day.

2) The sections of the test must be administered in the order in which they appear in the test booklet.

3) Provision must be made for adequate rest periods. These may be at the discretion of the test administrator but they should always fall between the six major sections of the test battery. The length and frequency of rest periods should depend upon such factors as the age and mental maturity of the pupils, temperature, etc. It is well to make sure that the pupils move around during rest periods and perferably go outdoors to play if possible. The noon hour will of course provide one intermission.

Two Points to Stress with Pupils

1) Because the tests are to be scored with a machine it is absolutely necessary that a special electrographic pencil be used. A supply of these pencils is being shipped with the tests. Pupils may have favorite pencils of their own or inadvertently pick up an ordinary pencil. Consequently it is necessary to repeatedly remind pupils to use the special pencils. The machine will not score sheets marked with ordinary pencils, regardless of how soft the lead may be.

2) Care must be taken that pupils do not write or make any marks whatsoever on the test booklets. When special machine scored answer sheets are used, the test booklets may be used repeatedly if they are not defaced. Great vigilance must be exercised, however, to be sure that the pupils do not forget.

Test Manuals

This mimeographed manual contains general instructions for the testing program and specific instructions for the Background Information Sheet and the Sample Questions. Specific instructions for the California Achievement Tests are printed and are supplied by the California Test Bureau with the tests. One copy of the manual is packed with each package of 25 copies of the test booklets. Persons administering the tests should make sure that they are using the directions for tests which are to be machine scored. These directions begin on page 18 of both the elementary and advanced manuals and on page 19 of the intermediate manual. Persons administering the tests should familiarize themselves thoroughly with the instructions for administering the tests and with the tests themselves.

No Handwriting Test

No handwriting test will be given and any reference to the handwriting test in the manual may be disregarded.

The Answer Sheets

Each pupil, in the course of taking the tests, will use three different answer sheets, one each for reading, arithmetic, and language. Since these come at three different levels, elementary, intermediate, and advanced, the test administrator will be working with nine different types of answer sheets. Care must be taken not to get them confused.

See that each pupil fills out completely the information called for on the answer sheets. Also, during the progress of the testing, persons proctoring the examination should check constantly to be sure the pupils are not confused as to the section of the answer sheet in which they should be marking.

Complete instructions for using the answer sheets are included in the printed manuals.

Time Limits

Time limits for the various sections of the California Achievement Tests are suggested in the manual. However, inasmuch as the tests are "power" rather than speed tests, these suggested limits need not be adhered to rigidly. On the other hand, it is not practicable to wait until all stragglers have finished a section. It is recommended that time be called when about 90% of the group have completed the section.

Preparing the Roster

Rosters of pupils taking the tests are to be prepared in duplicate. Both copies are to be returned with the answer sheets. Please use typewriter or, in the event a typewriter is not convenient, print by hand.

Be sure that all information called for at the top of the page is supplied. By "Type of School" is meant whether Indian Service, public, or mission, and whether day, reservation boarding, or non-reservation boarding. By "date" is meant date the tests were administered to the pupils listed below.

Make a separate roster for each grade tested in each school. More than one sheet may be used for a grade if required.

List the pupils in alphabetical order on the roster. Also, stack the completed answer sheets in alphabetical order for the pupils listed on the roster. Clip the answer sheets and both copies of the roster together and return as directed below.

Returning the Answer Sheets and Rosters

Completed answer sheets and rosters must be returned by mail, first class. Whenever possible these should be mailed under government frank.

It is important that the answer sheets not be folded or allowed to become "dog-eared" since this will make it impossible to put them through the scoring machine. Pack all answer sheets flat and reinforce the bundles of answer sheets with firm pieces of card-board.

Mail the answer sheets and rosters to:

The Guidance Bureau
University of Kansas
Lawrence, Kansas

These answer sheets and rosters should be mailed as soon as the testing is completed in any grade in any school. Promptness in returning the answer sheets will help to insure promptness in getting the test results back to the schools.

The Guidance Bureau of the University of Kansas will score tests only for pupils who have completed all sections of the test. Therefore, do not send in partial or incomplete data for a pupil. For example, do not send in the reading and arithmetic answer sheets for a pupil unless he has also taken the language test.

Returning Other Supplies

The electrographic pencils belong to the central testing office and are to be used in subsequent testing programs. Be sure to recover these pencils from the pupils, repack them in the boxes and ship them by parcel post. There may be some loss on these pencils but it should be held to a minimum.

The test booklets, test manuals, and unused copies of answer sheets, background information sheets, and sample question sheets also should be returned. There is not the same urgency about the return of these items, however, as of the marked answer sheets, rosters, and pencils. Consequently, these may be shipped by freight, if desired.

Send all items under this heading to:

L. Madison Coombs
Education Specialist
Haskell Institute
Lawrence, Kansas

SPECIFIC INSTRUCTIONS

BACKGROUND INFORMATION SHEET

1) See that all students have pencils. The special electrographic pencils are not necessary for this sheet, but they may be used if desired. Pen and ink may be used if preferred.

2) Distribute the sheets with the side headed, "Background Information" face up. (Instructions for the reverse side are printed on the sheet itself.)

3) Say:

"On the sheet which you have been given I want you to fill in some information about yourself. I will help you as we go along. Do not write anything at all on the back of the sheet.

"Write the date on the first line." (Write the date on the blackboard.)

"After the number '1' write your first name first, then your middle name, then your last name. Be sure to write clearly." (Printing or manuscript writing is desirable.) "If you are a boy, put a check mark after 'Boy'; if you are a girl put a check mark after 'Girl'.

"After number '3' write the name of this school." (For younger students write the name of the school on the blackboard.)

"After number '4' put a check mark in the blank after....." (indicate the appropriate blank, depending upon the type of school being tested.)

"Number '5' asks whether you are Indian or white. Put a check mark in the space after 'Indian', if you are Indian, and in the space after 'white', if you are white." (If all of the pupils in the group are Indian, recognition of that fact may be made).

"Number '6' asks you, if you are Indian, to state your degree of Indian blood. If you are a fullblood, write the word 'full' in the space at the right. If you are one-half Indian blood, you should write the fraction 1/2 in the space. If you are three-fourths Indian you should write the fraction 3/4, etc." (The person administering the tests should write these and other applicable fractions on the blackboard. Be sure to give students all the help they need in answering this question.)

"After number '7' write....." (name the grade or grades.)

"Number '8' asks how many years old you are now. If you have reached your tenth birthday, you will write '10'. If you will soon have your tenth birthday, but have not yet reached it, you will write '9'.

"After the number '9' write your birthday." (Help students in computation of their birth year. Be sure these are as accurate as possible.)

"Number '10' asks how old you were when you first started to school." (The younger students may need assistance in this computation.)

"Number '11' asks what languages you could speak when you first started to school.

Place a check mark after the correct answer. If you could only say 'Yes' or 'No', or 'Hello' in English, but always spoke in Indian to your parents, put a check mark after 'Indian only'. If you spoke neither English nor Indian when you first started to school, but some other language such as Spanish, write the name of that language in the space after 'Only'." (Check closely on the accuracy of the student's responses.)

"Number '12' asks how many years you have gone to school, including this year. Count all the years you have gone to school, including years when you did not attend the whole year."

"Number '13' asks what schools you have gone to. List all the schools you have attended, starting with the one where you were a beginner. You are also to show whether each school was a government, public, or mission school, whether it was a day, boarding, or non-reservation school and what grades you were in at that school." (Help the students to answer this item accurately.)

"Number '14' asks, 'Where is your permanent home?' You are to make check marks in the right spaces, and write in the other information called for." (Boarding school students should respond to this in relation to the home of their parents, or the location where they usually spend their vacations. It will probably be necessary for you to help some students with the distances from towns and the approximate population of towns. Give all the help necessary to insure accuracy.)

"Number '15' asks, 'Who are your friends?' This means, 'With whom do you play?' (The accuracy of the responses to this question is important.)

"After '16' check....." (Give the students the proper information.)

"After number '17' write the number which tells the grade you expect to finish before you stop going to school. How long do you expect to attend school?"

4) Do not permit students to write on the back side of the sheet. When students have finished the front page, collect the papers.

SPECIFIC INSTRUCTIONS

SAMPLE QUESTIONS

No Time Limit

1) See that each student has a special electrographic pencil with an eraser.

2) Say:

"You are going to take some tests today, but first you are to have some practice on how to mark your answers. These tests are probably a little different from any you have taken before, in that instead of marking your answers on the test booklet, you mark them on a separate answer sheet. This does not make the test any harder, but we want to be sure that you know how to go about marking the answers.

"In just a moment I am going to give you a sheet of paper with some sample questions on it. Do not make any marks on this paper until I tell you to do so. I will explain carefully what you are to do as we go along."

3) Distribute the Sample Question Sheets.

4) Say:

"Now look at the sheet which has been given you. You will notice that there are some Sample Questions above the line which runs across the page and some Answer Spaces below it. Think of the Answer Spaces below the line as if they were on a separate sheet of paper, for they will be on a separate sheet when you take the tests.

"Now look at question 1 under 'Test 1--Section A'. You see two words, 'b-e-e-t' and 'b-e-a-t'. Are these two words the same or are they different? Are they spelled the same? No, they are different. Now look at the Answer Spaces below the line, under Test 1--Section A. At the right of the number '1' are two answer spaces, one with 'S' above it, and the other with 'D' above it. Since the words in this question are different from each other, take your special pencil and make a heavy black mark within the pair of dotted lines under 'D'. Make the mark as long as the pair of dotted lines and move your pencil up and down firmly to make a heavy black line." (Demonstrate on blackboard.)

"Now look at question 2 under 'Test 1--Section A'. You see two words, 'c-o-m-p-a-r-e' and 'c-o-m-p-a-r-e'. Are these words the same or are they different? Yes, they are exactly the same. Now find the answer spaces to the right of the number '2' under Test 1--Section A below the line. Since the words in this question are the same, make a heavy black line with your special pencil between the pair of dotted lines under 'S'."

(Check to be sure that all the children are finding the correct answer spaces and are marking them properly. Give whatever help is needed to insure correct marking of the answer spaces.)

"Now look at question 3 under 'Test 1--Section C'. Toward the left hand side the sheet see the word 'bright'. Toward the right hand side of the page see four words, 'eat', 'small', 'dark', and 'read', numbered 1, 2, 3, and 4. You are to mark the number of the word that means the opposite or about the opposite of the first word. Which of the four numbered words means the opposite of 'bright'? (Let the group respond.) "Yes, 'dark', the word with the small 3 above it, is correct. Now, look at the answer spaces under Test 1--Section C at the right of the small heavy black 3. Make your heavy black mark within the pair of dotted lines under the small light black 3.

"Now look at question 4 under 'Test 1--Section C'. The first word is 'early' and the other words are 'walk', 'late', 'lock', and 'myth'. Which of these four words means the opposite of 'early'? Yes, 'late' is correct and it is number 2. Now find the second answer space for question 4 under Test 1--Section C and make your heavy black mark." (Check to see that the students are marking the paper correctly and that they are beginning to understand the procedure.)

"Now look at question 5 under 'Test 1--Section D'. This is much the same as 'Section C', above, except that here you are to mark the number of the word at the right which means the same as the word at the left. Which word means the same, or about the same, as 'talk'? Yes, 'speak' with the number 4 above it. Now find the fourth space for question 5 under Test 1--Section D in the answer spaces below and make your heavy black mark. Now do question 6 under Test 1--Section D. What word means the same, or about the same as 'walk'? Yes, 'stroll', number 1, is correct. Make your mark in the first answer space for question 6 under Test 1--Section D.

"Now look at question 1 under 'Test 3--Section A'. At the left see the word 'twelve', spelled out. At the right of the word 'twelve' see four numbers: '10', '12', '24', and '2', and the word 'None', with the letters a, b. c, d, and e before them. For some of the problems none of the answers given may be correct. If you cannot work a problem, or if you think that none of the answers given is correct, mark the letter 'e'. What letter does the number, 12, have in front of it? Yes, 'b' is correct. Therefore, you should make a heavy black mark under the 'b' in answer row '1', under Test 3--Section A in the answer spaces.

"Now look at question 2 under 'Test 3--Section A'. The words, 'one hundred two' are spelled out. What is the letter in front of the number '102' at the right? Yes, 'c' is correct. Make a heavy black mark under the 'c' in answer row '2' under Test 3--Section A in the answer spaces."

5) See that each student is supplied with a sheet of scratch paper.

6) Say:

"Now look at question (3), in parentheses, under 'Test 4--Section D'. Have your scratch paper ready. You need not copy any problem. Just place your scratch paper under the problem, then do your figuring. Remember not to do any figuring on the question sheet." (Demonstrate how to place the scratch paper, if necessary.) "This is a problem in addition. What is the correct answer?" (Wait until the students have had time to find the answer and then allow the class to respond.) "Yes, '39' is the correct answer. Do you find '39' among the numbers at the right? Yes. What letter is in front of it? That is right, 'd'. Now make your mark under 'd' in answer row (3) under Test 4--Section D in the answer spaces.

"Now look at question (4) under 'Test 4--Section D'. Do it in the same way. What is the correct answer? Yes, '34'. What is the letter in front of '34'? Yes, 'a' Now make your mark under 'a' in answer row (4) under Test 4--Section D in the answer spaces.

7) Check to see that all have marked the sheets correctly and collect the sheets and the scratch paper.

BACKGROUND INFORMATION

(To be completed by the student with the teacher's help)

Date ....
Month Day Year

1) Name .... 2) Boy .... Girl ....
First Middle Last

3) School ....

4) Type of School: Indian Service ....Public .... Mission ....

5) Are you Indian .... White ....? 6) If Indian, degree of blood ....

7) What grade are you in now? .... 8) How many years old are you now? ....

9) When were you born? ....
Month Day Year

10) How old were you when you first started to school? ....

11) What languages could you speak when you **first** started to school?

English only .... Indian only .... Both English and Indian ....

Only .... Both English and ....

12) How many years have you gone to school? (Including this year) ....

13) What schools have you gone to?

Name of School	Government, Public, or Mission	Day, Boarding, or Non-Reservation	Grades
....	....	....	....
....	....	....	....
....	....	....	....
....	....	....	....

14) Where is your permanent home?

(a) **ON** a reservation.................... (b) **NOT ON** a reservation....................

15) IF YOU LIVE IN A TOWN OR VILLAGE, how many people live in this town?

....

IF YOU LIVE IN THE COUNTRY,
(a) How far is it to the nearest town?

....

(b) How many people live in this town?

....

16) Who are your friends?

All of them are Indian boys or girls ....
Most of them are Indian, some are white ....
Most of them are white, some are Indian ....
All of them are white boys or girls ....

17) Are the students in your school:

Only Indians....................Mostly Indians .... Half whites, half Indians....................
Mostly whites .... Only whites ....

18) What grade in school do you expect to finish? ....

H

INFORMATION SHEET

(To be completed by teacher or school official)

1) School enrollment ....

2) How long has this student attended this school? ....

3) Student's attendance: (a) .... (b) .... (c) ....

4) Student's general physical condition appears to be:

Above average.................... Average.................... Below average....................

INSTRUCTIONS

(For filling in above)

1) School enrollment is the total number of students enrolled in the school during the 1953-54 school year thus far.

2) Give the total number of years that the student has attended this school, including the 1953-54 academic year. Count every year in which he was enrolled and attended for a month or more.

3) Three entries are required to describe attendance:

   (a) Enter on the first line the total number of days of school offered during the school year just past, 1952-53, not the current school year. This figure indicates how many days the student could have been in school if he had attended regularly. Boarding schools should count **only the number of days on which a regular classroom was in operation.**

   (b) On the second line, enter the number of days the student was absent from this regular classroom program during the 1952-53 school year, if he was attending your school at that time. If a boarding school student was absent on a Sunday, for example, this would not be included in this figure.

   (c) On the third line indicate whether your program last year was a **day** program, in which students returned home each afternoon; a **five-day boarding program,** in which students lived at the school Monday through Friday; or a **full boarding program,** in which the students lived at the school throughout the school year.

4) Check one of the three spaces which, in your judgment, best describes the student's general physical condition at present.

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APPENDIX B

Method for Determining the Area Hierarchy of Achievement

Table B-1 Order of Areas at the Mean on the Several Skills

Table B-2 Comparison of Means of Normalized T-Scores Assigned to Ranks of Areas

Table B-3 Number, Mean, and Standard Deviation by Grade and Area

The first step in securing a general hierarchy of the areas with regard to achievement was to establish an ordering of the six areas on each of the achievement tests for each grade. The ranks of mean (average) achievement for each grade are shown in Table B-1. The table should be read by going across the rows. For instance, we find that fourth graders in the Anadarko area had the highest mean score for the reading vocabulary test, the Aberdeen area fourth graders had the second highest mean, and so on to the Phoenix area whose fourth graders had the lowest mean on this test.

The table can be read down the columns, too, to obtain a picture of the consistency with which a particular area held a rank throughout the grades tested. A study of the table will show that there was some variability of ranks among the areas. The question which is then posed is: Can the ranks of area mean achievement be "averaged" in some way to give an over-all picture of the ranks of the areas in all skills and grades?

Ranks, as such, cannot be added and averaged since they do not take account of the size of differences between ranks. A method is available however by which normalized standard scores are assigned to ranks. These scores are positioned along the distribution curve of normal probability. They have a mean of 50 and a standard deviation of 10. As the number of ranks changes, the specific standard scores which are used changes, but for any series of ranks the scores always have a mean of 50.

When six categories are ranked the first rank has a score of 64, the second a score of 57, the third 52, the fourth 48, the fifth 43, and the sixth 36. These scores are shown at the top of each column in Table B-1. Thus we see that for reading vocabulary the scores assigned to the Aberdeen area from grade 4 through 12 were 57, 52, 52, 57, 57, 57, 57, 57, and 57. The sum of these scores is 503 and their arithmetic average is 55.89. This mean standard score for the Aberdeen area can then be compared with the mean on reading vocabulary for each of the other areas.

(The Anadarko and Muskogee area raw score means were not significantly different from each other for any of the seven achievement tests in the tenth, eleventh, and twelfth grades. Both areas were therefore combined on this level. For the purpose of ranking, these Oklahoma areas were both listed for two adjacent ranks in the three grades mentioned. The standard score assigned to each area was the mid-point between the standard scores assigned to the two adjacent ranks. Thus six ranks were always maintained. Each area was then ranked sixty-three times, i.e., in nine grades on seven tests.)

The standard scores assigned to the rankings of an area for all grades in all seven skills were added and averaged to obtain the general hierarchy. The mean standard score of each area was as follows:

Anadarko	57.65
Billings	55.94
Aberdeen	53.86
Muskogee	49.00
Albuquerque	43.37
Phoenix	40.00

Standard deviations were calculated on the standard scores for each area. Tests for the significance of the difference between means of standard scores were then made. The results of these tests of significance of difference are shown in Table B-2. These may be summarized by saying that there was no significant difference between mean rank scores of the Anadarko and Billings areas but the differences between all other pairs of means were significant. Significance was here defined to be at the .05 level of confidence. By this it is meant that a difference as great as or greater than the observed difference in means would have occurred less than 5 times in 100 by chance alone. The difference between the means for the Billings and Aberdeen areas very closely approached the .05 level of probability.

The method of assigning normalized standard scores to ranks, and the tables of standard scores may be further investigated by referring to "Tables for Transmutation of Orders of Merit into Units of Amount or Scores" by Kenneth E. Anderson, Robert T. Gray, and Einar V. Kullstedt, in the Journal of Experimental Education, 1954, XXII, 247-256.

TABLE B-1

ORDER OF AREAS AT THE MEAN ON THE SEVERAL SKILLS

Reading Vocabulary

RANK	1	2	3	4	5	6
T-SCORE	64	57	52	48	43	36
Grade						
4	Anadarko	Aberdeen	Muskogee	Billings	Albuquerque	Phoenix
5	Anadarko	Billings	Aberdeen	Albuquerque	Muskogee	Phoenix
6	Anadarko	Billings	Aberdeen	Muskogee	Albuquerque	Phoenix
7	Anadarko	Aberdeen	Billings	Muskogee	Albuquerque	Phoenix
8	Anadarko	Aberdeen	Billings	Muskogee	Albuquerque	Phoenix
9	Billings	Aberdeen	Anadarko	Muskogee	Phoenix	Albuquerque
10	Billings	Aberdeen	Oklahoma	Oklahoma	Phoenix	Albuquerque
11	Billings	Aberdeen	Oklahoma	Oklahoma	Phoenix	Albuquerque
12	Billings	Aberdeen	Oklahoma	Oklahoma	Phoenix	Albuquerque

Reading Comprehension

Grade						
4	Anadarko	Muskogee	Billings	Albuquerque	Aberdeen	Phoenix
5	Anadarko	Billings	Muskogee	Aberdeen	Albuquerque	Phoenix
6	Anadarko	Billings	Aberdeen	Muskogee	Albuquerque	Phoenix
7	Anadarko	Billings	Aberdeen	Muskogee	Albuquerque	Phoenix
8	Anadarko	Billings	Aberdeen	Muskogee	Albuquerque	Phoenix
9	Anadarko	Billings	Aberdeen	Phoenix	Muskogee	Albuquerque
10	Billings	Aberdeen	Oklahoma	Oklahoma	Albuquerque	Phoenix
11	Billings	Aberdeen	Albuquerque	Oklahoma	Oklahoma	Phoenix
12	Billings	Aberdeen	Phoenix	Oklahoma	Oklahoma	Albuquerque

Arithmetic Reasoning

Grade						
4	Anadarko	Muskogee	Aberdeen	Albuquerque	Billings	Phoenix
5	Anadarko	Billings	Aberdeen	Muskogee	Albuquerque	Phoenix
6	Anadarko	Aberdeen	Muskogee	Billings	Albuquerque	Phoenix
7	Anadarko	Billings	Aberdeen	Albuquerque	Muskogee	Phoenix
8	Anadarko	Billings	Aberdeen	Albuquerque	Muskogee	Phoenix
9	Anadarko	Billings	Aberdeen	Muskogee	Albuquerque	Phoenix
10	Billings	Aberdeen	Oklahoma	Oklahoma	Phoenix	Albuquerque
11	Billings	Oklahoma	Oklahoma	Aberdeen	Albuquerque	Phoenix
12	Billings	Aberdeen	Phoenix	Oklahoma	Oklahoma	Albuquerque

TABLE B-1 (continued)

Arithmetic Fundamentals

RANK	1	2	3	4	5	6
T-SCORE	64	57	52	48	43	36
Grade						
4	Aberdeen	Albuquerque	Billings	Muskogee	Anadarko	Phoenix
5	Anadarko	Albuquerque	Billings	Aberdeen	Muskogee	Phoenix
6	Muskogee	Aberdeen	Billings	Albuquerque	Anadarko	Phoenix
7	Anadarko	Billings	Albuquerque	Aberdeen	Muskogee	Phoenix
8	Anadarko	Billings	Aberdeen	Muskogee	Albuquerque	Phoenix
9	Anadarko	Billings	Aberdeen	Albuquerque	Phoenix	Muskogee
10	Phoenix	Aberdeen	Billings	Oklahoma	Oklahoma	Albuquerque
11	Billings	Phoenix	Aberdeen	Oklahoma	Oklahoma	Albuquerque
12	Phoenix	Billings	Aberdeen	Oklahoma	Oklahoma	Albuquerque
			Language			
Grade						
4	Anadarko	Muskogee	Albuquerque	Aberdeen	Billings	Phoenix
5	Anadarko	Muskogee	Albuquerque	Billings	Aberdeen	Phoenix
6	Anadarko	Albuquerque	Muskogee	Billings	Aberdeen	Phoenix
7	Anadarko	Muskogee	Aberdeen	Albuquerque	Billings	Phoenix
8	Anadarko	Muskogee	Albuquerque	Billings	Aberdeen	Phoenix
9	Anadarko	Billings	Muskogee	Aberdeen	Albuquerque	Phoenix
10	Billings	Aberdeen	Oklahoma	Oklahoma	Albuquerque	Phoenix
11	Billings	Oklahoma	Oklahoma	Albuquerque	Aberdeen	Phoenix
12	Billings	Oklahoma	Oklahoma	Phoenix	Aberdeen	Albuquerque
			Spelling			
Grade						
4	Aberdeen	Anadarko	Albuquerque	Muskogee	Billings	Phoenix
5	Anadarko	Billings	Aberdeen	Albuquerque	Muskogee	Phoenix
6	Anadarko	Aberdeen	Muskogee	Billings	Albuquerque	Phoenix
7	Aberdeen	Anadarko	Billings	Muskogee	Albuquerque	Phoenix
8	Aberdeen	Anadarko	Billings	Muskogee	Albuquerque	Phoenix
9	Aberdeen	Anadarko	Billings	Phoenix	Muskogee	Albuquerque
10	Aberdeen	Oklahoma	Oklahoma	Billings	Albuquerque	Phoenix
11	Billings	Aberdeen	Oklahoma	Oklahoma	Phoenix	Albuquerque
12	Aberdeen	Billings	Phoenix	Oklahoma	Oklahoma	Albuquerque
			Total Score			
Grade						
4	Anadarko	Aberdeen	Muskogee	Albuquerque	Billings	Phoenix
5	Anadarko	Billings	Aberdeen	Albuquerque	Muskogee	Phoenix
6	Anadarko	Muskogee	Billings	Aberdeen	Albuquerque	Phoenix
7	Anadarko	Aberdeen	Billings	Muskogee	Albuquerque	Phoenix
8	Anadarko	Billings	Aberdeen	Muskogee	Albuquerque	Phoenix
9	Anadarko	Billings	Aberdeen	Phoenix	Muskogee	Albuquerque
10	Billings	Aberdeen	Oklahoma	Oklahoma	Phoenix	Albuquerque
11	Billings	Aberdeen	Oklahoma	Oklahoma	Phoenix	Albuquerque
12	Billings	Aberdeen	Phoenix	Oklahoma	Oklahoma	Albuquerque

TABLE B-2

COMPARISON OF MEANS OF NORMALIZED T-SCORES ASSIGNED TO RANKS OF AREAS

(With race-school groups, skills, and all grades combined)

	Mean Diff.	Standard Error of the Mean	Sum	Standard Error of the Difference Between Means	"t"	P .05
Anadarko Billings	1.71	0.9856 0.8315	1.6628	1.289	1.327	Not significant
Anadarko Aberdeen	3.79	0.9856 0.7158	1.4538	1.218	3.111	Significant
Anadarko Muskogee	8.65	0.9856 0.6283	1.3662	1.168	7.406	Significan
Anadarko Albuquerque	14.28	0.9856 0.7729	1.5688	1.252	11.406	Significant
Anadarko Phoenix	17.65	0.9856 0.8896	1.7628	1.327	13.000	Significant
Billings Aberdeen	2.08	0.8315 0.7158	1.2038	1.097	1.896	Significant
Billings Muskogee	6.94	0.8315 0.6283	1.0862	1.042	6.660	Significant
Billings Albuquerque	12.57	0.8315 0.7729	1.2888	1.135	11.075	Significant
Billings Phoenix	15.94	0.8315 0.8896	1.4828	1.217	13.098	Significant
Aberdeen Muskogee	4.86	0.7158 0.6283	0.9071	0.9524	5.103	Significant
Aberdeen Albuquerque	10.49	0.7158 0.7729	1.1097	1.053	9.962	Significant
Aberdeen Phoenix	13.86	0.7158 0.8896	1.3038	1.141	12.147	Significant
Muskogee Albuquerque	5.63	0.6283 0.7729	0.9921	0.996	5.653	Significant
Muskogee Phoenix	9.00	0.6283 0.8896	1.1861	1.089	8.264	Significant
Albuquerque Phoenix	3.37	0.7729 0.8896	1.3888	1.178	2.861	Significant

N = 63 for all groups

TABLE B-3

NUMBER, MEAN, AND STANDARD DEVIATION BY GRADE AND AREA

GRADE 4

		Read. Vocab.		Read. Comp.		Arith. Reas.		Arith. Fund.		Language		Spelling		Total Score	
Area	Number	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
Phoenix	568	47.94	14.14	14.80	6.07	14.66	5.46	17.16	6.42	21.68	6.64	8.30	4.72	125.80	33.02
Albuquerque	671	49.88	13.30	16.45	5.46	16.22	5.62	18.70	7.05	24.58	6.12	10.49	5.17	136.36	32.85
Aberdeen	1001	54.33	14.08	16.22	6.27	16.84	6.04	18.85	7.13	23.68	6.57	12.36	5.21	141.25	34.55
Billings	464	50.99	16.18	16.66	6.24	15.99	6.56	18.58	6.63	22.26	6.71	9.44	5.34	133.75	36.61
Anadarko	219	60.31	13.87	19.88	6.60	18.88	6.24	17.78	6.51	26.90	6.61	11.97	5.52	155.74	36.14
Muskogee	257	52.46	14.10	17.01	5.90	17.27	5.56	18.55	6.66	25.21	6.36	9.98	5.57	140.46	33.87

GRADE 5

		Read. Vocab.		Read. Comp.		Arith. Reas.		Arith. Fund.		Language		Spelling		Total Score	
Area	Number	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
Phoenix	513	52.58	13.34	18.07	6.53	19.80	6.21	24.28	6.85	25.48	6.74	11.12	5.66	157.50	36.04
Albuquerque	556	59.89	12.12	20.43	6.08	22.35	6.13	27.37	7.51	28.83	6.31	13.64	5.58	170.75	34.51
Aberdeen	965	62.84	11.81	21.22	6.08	22.73	6.51	26.61	7.50	27.46	6.15	13.80	5.90	174.73	36.40
Billings	455	63.85	13.71	23.27	6.19	22.94	6.69	26.95	7.33	27.80	6.47	14.21	5.97	178.06	37.30
Anadarko	249	67.09	12.64	24.36	6.60	24.68	6.38	27.68	6.96	29.87	5.83	14.57	5.66	188.34	35.30
Muskogee	296	59.59	12.46	21.58	5.96	22.44	6.19	24.86	7.11	28.92	5.89	12.56	6.25	170.05	32.80

GRADE 6

		Read. Vocab.		Read. Comp.		Arith. Reas.		Arith. Fund.		Language		Spelling		Total Score	
Area	Number	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
Phoenix	504	62.96	13.33	22.13	6.89	23.49	6.63	30.21	8.91	28.68	6.52	14.75	6.04	182.62	39.72
Albuquerque	658	64.98	11.88	23.68	6.48	26.10	6.34	34.85	10.02	31.07	5.91	16.06	6.03	196.33	39.14
Aberdeen	923	69.53	12.38	24.85	6.51	26.89	6.50	35.16	10.16	29.68	6.39	16.49	5.81	202.65	39.12
Billings	421	70.16	12.73	25.27	7.05	26.47	7.01	35.01	10.49	30.33	6.49	16.36	5.97	202.70	31.39
Anadarko	242	70.78	12.66	26.69	6.86	27.24	6.01	34.45	9.21	31.22	6.31	16.52	5.99	206.91	38.64
Muskogee	289	68.51	12.24	24.47	6.79	26.59	6.26	36.60	9.88	30.77	6.99	16.38	6.16	203.39	39.74

TABLE B-3 (continued)

GRADE 7

		Read. Vocab.		Read. Comp.		Arith. Reas.		Arith. Fund.		Language		Spelling		Total Score	
Area	Number	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
Phoenix	420	40.05	11.86	22.91	6.96	18.30	6.60	29.49	12.67	31.42	8.29	11.57	6.13	153.30	40.30
Albuquerque	795	43.29	11.51	24.74	7.12	21.71	6.49	37.28	12.25	35.35	9.14	12.93	5.97	175.14	39.11
Aberdeen	857	46.91	12.21	26.21	7.50	22.11	6.30	37.22	12.68	35.80	9.09	15.47	6.32	184.15	43.35
Billings	433	46.18	13.30	26.22	7.76	22.23	7.45	37.52	13.52	34.75	9.51	14.94	6.25	181.82	47.50
Anadarko	306	48.41	13.27	28.02	7.82	23.71	7.06	37.68	13.18	40.28	10.17	15.35	6.31	193.55	47.23
Muskogee	271	45.07	13.08	25.49	7.38	21.38	6.12	36.47	12.39	36.72	9.41	14.07	6.46	179.51	45.51

GRADE 8

		Read. Vocab.		Read. Comp.		Arith. Reas.		Arith. Fund.		Language		Spelling		Total Score	
Area	Number	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
Phoenix	416	42.25	15.21	25.94	8.92	23.54	8.65	40.62	13.93	35.38	9.45	13.06	6.63	182.07	51.12
Albuquerque	717	48.62	11.97	27.34	7.85	25.07	7.60	43.05	13.65	39.80	9.76	15.08	6.87	201.31	45.72
Aberdeen	776	52.39	11.88	29.31	7.47	25.80	7.74	43.82	14.68	39.07	9.18	17.88	6.64	208.64	46.35
Billings	327	51.62	13.54	29.44	8.31	27.10	9.18	44.75	15.37	39.48	9.57	17.04	6.66	209.30	53.16
Anadarko	340	53.62	12.17	30.60	7.70	28.86	7.80	48.15	14.72	42.94	8.76	17.49	6.28	221.73	46.71
Muskogee	264	50.27	12.63	28.63	7.64	24.46	7.11	43.07	14.50	40.00	8.81	16.39	6.47	202.81	45.97

GRADE 9

		Read. Vocab.		Read. Comp.		Arith. Reas.		Arith. Fund.		Language		Spelling		Total Score	
Area	Number	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
Phoenix	262	53.38	12.05	32.22	7.70	29.13	9.15	50.06	13.90	41.92	8.46	18.70	6.16	226.03	47.27
Albuquerque	690	53.00	11.91	30.31	8.64	29.99	8.84	49.07	15.00	42.51	9.65	17.25	6.82	220.67	48.71
Aberdeen	763	57.76	12.03	33.12	8.28	31.42	9.39	49.54	15.52	42.82	8.91	19.96	6.44	234.93	50.85
Billings	207	58.58	12.48	33.42	7.82	32.64	9.67	51.01	16.16	43.61	10.34	19.37	6.46	237.69	54.59
Anadarko	459	56.92	11.51	33.48	7.52	34.06	8.96	52.43	16.56	45.15	8.68	19.40	6.18	241.55	48.91
Muskogee	422	53.82	12.53	30.89	8.51	30.08	8.85	47.61	15.74	43.55	9.27	18.28	6.66	224.23	41.18

TABLE B-3 (continued)

GRADE 10

		Read. Vocab.		Read. Comp.		Arith. Reas.		Arith. Fund.		Language		Spelling		Total Score	
Area	Number	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
Phoenix	219	32.06	11.63	28.70	7.26	27.73	11.11	50.35	14.19	48.30	9.52	10.42	4.90	197.26	46.42
Albuquerque	431	31.39	10.23	28.99	6.67	25.98	8.76	43.76	13.58	49.30	9.70	10.77	4.85	189.72	42.74
Aberdeen	662	36.12	11.71	30.07	7.31	29.78	9.54	48.24	15.14	50.28	10.84	12.58	5.07	205.17	49.58
Billings	174	37.58	12.86	31.03	7.87	30.91	10.45	47.20	15.04	50.30	10.37	11.97	5.15	208.98	42.06
Oklahoma	653	33.25	10.81	29.22	6.79	28.16	9.10	45.64	14.86	49.92	10.32	12.04	4.95	198.26	45.88

GRADE 11

		Read. Vocab.		Read. Comp.		Arith. Reas.		Arith. Fund.		Language		Spelling		Total Score	
Area	Number	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
Phoenix	154	35.54	12.56	31.00	7.56	29.69	10.93	49.38	15.05	50.62	9.46	12.80	5.56	208.91	52.22
Albuquerque	314	34.92	12.03	31.78	6.79	29.85	9.63	46.36	15.02	51.93	10.15	12.79	5.29	206.03	46.64
Aberdeen	506	40.43	12.93	32.20	6.91	30.19	9.52	47.60	14.66	50.69	10.58	13.93	5.46	217.11	50.43
Billings	141	43.84	12.95	34.53	6.89	32.81	10.25	50.37	14.32	56.36	9.71	14.74	5.51	233.01	40.18
Oklahoma	570	37.82	11.37	31.55	7.40	30.39	9.46	46.93	15.30	53.46	10.41	13.28	5.63	213.44	47.42

GRADE 12

		Read. Vocab.		Read. Comp.		Arith. Reas.		Arith. Fund.		Language		Spelling		Total Score	
Area	Number	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
Phoenix	87	39.58	12.59	34.30	6.77	31.17	12.04	54.09	14.96	53.80	9.16	14.60	4.60	227.59	48.65
Albuquerque	271	38.73	11.77	30.63	7.21	27.54	9.26	46.37	13.60	52.30	9.84	13.45	5.14	209.73	45.33
Aberdeen	453	44.46	12.88	34.97	6.85	32.14	9.71	48.57	14.33	52.97	9.89	15.39	5.51	230.29	48.73
Billings	123	45.74	14.07	35.17	7.45	33.02	10.84	50.09	14.42	56.96	10.43	14.71	5.82	235.56	53.35
Oklahoma	491	40.46	12.17	33.03	7.26	31.05	9.32	47.26	15.33	54.50	11.87	13.85	5.66	220.06	48.91

APPENDIX C

Determining the Race-School Hierarchy of Achievement

Table C-1a Comparison of Race-School Groups Within Each Area on All Skills and Total Score Using Ranks Converted to Normalized T-Scores

Table C-1b Comparison of Means of Normalized T-Scores Assigned to Ranks of Race-School Groups

Table C-2 Mean Raw Scores and Standard Deviations of Race-School Groups by Area

Table C-3 Differences Between Mean Scores of Race-School Groups According to Grade Level in Each Area

DETERMINING THE RACE-SCHOOL HIERARCHY OF ACHIEVEMENT

The same method was used to obtain a general hierarchy of race-school group achievement in each area as was used to obtain the area hierarchy. The method was described in detail in Appendix B. There were four race-school groups in each area except in the two Oklahoma areas, where no mission schools participated. The standard scores assigned to groups of three and four ranks are as follows:

Rank of 1	60	62
2	50	53
3	40	47
4		38

The mean standard score of each race-school group in each area is shown in Table C-1a. Sixty-three ranks were utilized to obtain the mean standard score assigned to the ranks of all the race-school groups, with the exception of Indian children in Federal schools in the Billings area. In that area there were too few Indian children in Federal schools beyond the tenth grade to utilize them. Tests for significance between mean standard scores were made between the groups (Table C-1b). All comparisons within an area, with but two exceptions, exceeded the .01 level of confidence, to indicate the high probability that the differences were due to other than chance variation. The two exceptions both involved the same two race-school groups, Indian children in public and mission schools, in the Aberdeen and Albuquerque areas. In both cases the probability exceeded .05, indicating a relatively high probability that the differences were due to chance variation.

Table C-2 provides the mean raw scores and the number in each race-school group in each area on each test for every grade. By an inspection of this table one may see how the standard scores were assigned since the highest mean for a grade in an area was given a rank of one, and so on.

Tests of significance of difference between mean raw scores of race-school groups in an area were made. The results of these tests are shown in Table C-3.

TABLE C-1a

COMPARISON OF RACE-SCHOOL GROUPS WITHIN EACH AREA ON ALL SKILLS AND TOTAL SCORE USING RANKS CONVERTED TO NORMALIZED T-SCORES

ABERDEEN

	FI	PW	PI	MI
Total Standard Score	2508	3849	3105	3138
Mean	39.81	61.10	49.29	49.81

PHOENIX

	FI	PW	PI	MI
Total Standard Score	2874	3684	3450	2592
Mean	45.62	58.49	54.76	41.14

ALBUQUERQUE

	FI	PW	PI	MI
Total Standard Score	3222	3603	2838	2937
Mean	51.14	57.19	45.05	46.62

MUSKOGEE

	FI	PW	PI	MI
Total Standard Score	2790	3520	3140	
Mean	44.29	55.87	49.84	

ANADARKO

	FI	PW	PI	MI
Total Standard Score	2650	3610	3190	
Mean	42.06	57.30	50.64	

BILLINGS

	FI	PW	PI	MI
Total Standard Score	2177	3844	3250	2629
Mean	34.56	61.02	51.59	41.73

Number = 63 for all groups, except Federal Indian children in the Billings area where Number = 49.

ABLE C-1b

COMPARISON OF MEANS OF NORMALIZED T-SCORES ASSIGNED TO RANKS OF RACE-SCHOOL GROUPS

MUSKOGEE

Race-School	Mean Diff.	Standard Error of the Mean	Sum	Standard Error of the Difference Between Means	"t"	P .05
FI	-11.58	0.9041	1.611	1.2692	9.12	Significant
PW		0.8724				
FI	-5.55	0.9041	1.415	1.1895	4.67	Significant
PI		0.7731				
PW	6.03	0.8724	1.359	1.1657	5.17	Significant
PI		0.7731				
ANADARKO						
FI	-15.24	0.6902	0.8512	0.9226	16.52	Significant
PW		0.6122				
FI	-8.58	0.6902	0.9899	0.9949	8.62	Significant
PI		0.7166				
PW	-6.66	0.6122	0.8883	0.9424	7.07	Significant
PI		0.7166				
BILLINGS						
FI	-16.59	0.8384	0.8176	0.9042	18.35	Significant
PW		0.3387				
FI	-7.16	0.8384	0.8634	0.9291	7.71	Significant
PI		0.4006				
FI	2.70	0.8384	1.088	1.0430	2.59	Significant
MI		0.6209				
PW	9.43	0.3387	0.2752	0.5245	17.98	Significant
PI		0.4006				
PW	19.29	0.3387	0.5002	0.7072	27.28	Significant
MI		0.6209				
PI	9.86	0.4006	0.5460	0.7389	13.34	Significant
MI		0.6209				

Number = 63 for all groups, except Federal Indian children in the Billings area where Number = 49.

TABLE C-1b (continued)

ABERDEEN

Race-School	Mean Diff.	Standard Error of the Mean	Sum	Standard Error of the Difference Between Means	"t"	P .05
FI	-21.29	0.4864	0.4035	0.6352	33.52	Significant
PW		0.4086				
FI	-9.48	0.4864	0.6566	0.8103	11.70	Significant
PI		0.6481				
FI	-10.00	0.4864	0.6997	0.8364	11.96	Significant
MI		0.6805				
PW	11.81	0.4086	0.5870	0.7661	15.42	Significant
PI		0.6481				
PW	11.29	0.4086	0.6300	0.7937	14.22	Significant
MI		0.6805				
PI	-.52	0.6481	0.8831	0.9397	0.553	Not Significant
MI		0.6805				
			PHOENIX			
FI	-12.87	0.6557	0.9101	0.9539	13.49	Significant
PW		0.6929				
FI	-9.14	0.6557	0.9432	0.9711	9.41	Significant
PI		0.7164				
FI	4.48	0.6557	0.8720	0.9338	4.80	Significant
MI		0.6649				
PW	3.73	0.6929	0.9933	0.9966	3.74	Significant
PI		0.7164				
PW	17.35	0.6929	0.9222	0.9602	18.07	Significant
MI		0.6649				
PI	13.62	0.7164	0.9553	0.9773	13.94	Significant
MI		0.6649				

TABLE C-1b (continued)

ALBUQUERQUE

Race-School	Mean Diff.	Standard Error of the Mean	Sum	Standard Error of the Difference Between Means	"t"	P .05
FI	-6.05	0.9663	1.568	1.2521	4.83	Significant
PW		0.7965				
FI	6.09	0.9663	1.838	1.3557	4.49	Significant
PI		0.9509				
FI	4.52	0.9663	2.018	1.4205	3.18	Significant
MI		1.0411				
PW	12.14	0.7965	1.539	1.2405	9.79	Significant
PI		0.9509				
PW	10.57	0.7965	1.718	1.3107	8.06	Significant
MI		1.0411				
PI	-1.57	0.9509	1.988	1.4099	1.11	Not Significant
MI		1.0411				

TABLE C-2

MEAN RAW SCORES AND STANDARD DEVIATIONS OF RACE-SCHOOL GROUPS BY AREA

PHOENIX AREA

Grade	Race-School	N	Reading Vocabulary Mean	Reading Vocabulary S. D.	Reading Comprehension Mean	Reading Comprehension S. D.
4	FI	190	47.707	13.491	14.237	5.784
	PW	75	50.654	16.270	15.077	6.202
	PI	47	51.444	13.867	14.778	5.282
	MI	65	43.769	15.090	12.692	5.220
5	FI	186	56.733	12.013	17.481	6.116
	PW	70	63.214	13.172	21.143	6.369
	PI	34	54.500	15.189	16.706	5.213
	MI	56	53.339	14.349	16.375	6.610
6	FI	154	63.656	12.645	21.805	6.414
	PW	62	66.127	15.543	25.175	6.370
	PI	40	66.615	11.942	24.949	5.817
	MI	78	58.603	13.349	19.821	5.675
7	FI	184	40.152	10.968	22.951	6.122
	PW	41	50.415	13.982	30.780	8.624
	PI	17	44.063		27.188	
	MI	61	37.164	18.766	21.016	5.973
8	FI	148	48.723	11.140	26.696	6.448
	PW	50	54.000	12.373	31.000	9.258
	PI	17	55.882		32.588	
	MI	65	37.615	12.454	22.615	6.703
9	FI	58	47.431	11.670	30.276	7.228
	PW	44	60.864	11.900	36.318	9.124
	PI	19	57.789		35.211	
	MI	45	51.111	11.247	29.667	6.793
10	FI	91	28.319	8.687	29.473	6.471
	PW	32	38.765	15.070	31.118	9.572
	PI	15	42.077		33.769	
	MI	22	26.227		24.045	
11	FI	55	30.545	8.315	28.364	7.844
	PW	29	48.000	14.103	36.333	7.626
	PI	10	37.222		30.556	
	MI	15	31.267		28.400	
12	FI	31	35.710	7.801	32.806	6.339
	PW	17	54.588		39.176	
	PI	4	42.500		31.500	
	MI	13	34.769		32.000	

TABLE C-2 (continued)

PHOENIX AREA

Grade	Race-School	N	Arithmetic Reasoning Mean	Arithmetic Reasoning S. D.	Arithmetic Fundamentals Mean	Arithmetic Fundamentals S. D.
4	FI	190	14.356	5.758	19.435	7.233
	PW	75	14.564	5.207	17.192	5.372
	PI	47	14.333	5.394	17.556	6.504
	MI	65	12.769	5.606	15.615	5.763
5	FI	185	19.620	5.964	24.487	6.925
	PW	70	23.500	6.447	25.857	7.029
	PI	34	21.265	6.528	25.824	6.748
	MI	56	18.071	6.517	21.286	7.533
6	FI	154	23.526	6.962	30.182	8.926
	PW	62	27.635	5.854	33.667	7.071
	PI	40	25.205	6.229	31.487	7.236
	MI	78	22.321	6.464	28.603	9.852
7	FI	184	17.190	7.268	31.701	12.526
	PW	41	24.439	6.903	40.171	12.235
	PI	17	21.688		37.250	
	MI	61	17.246	7.212	26.918	9.242
8	FI	148	22.777	8.704	40.007	12.958
	PW	50	27.000	7.626	47.600	13.274
	PI	17	30.235		53.176	
	MI	65	27.462	7.433	36.769	13.733
9	FI	58	26.828	7.313	49.328	13.153
	PW	44	36.091	10.359	58.932	13.390
	PI	19	34.579		56.105	
	MI	45	24.111	6.613	47.556	11.194
10	FI	91	23.923	8.326	48.209	14.440
	PW	32	55.382	16.997	55.382	16.997
	PI	15	35.231		56.308	
	MI	22	20.409		52.727	
11	FI	55	23.636	7.996	42.818	14.680
	PW	29	38.333	9.643	60.000	12.004
	PI	10	31.333		49.667	
	MI	15	25.267		44.867	
12	FI	31	29.258	9.473	52.161	16.456
	PW	17	42.882		65.529	
	PI	4	29.250		55.500	
	MI	13	23.231		49.308	

TABLE C-2 (continued)

PHOENIX AREA

Grade	Race-School	N	Language Mean	Language S. D.	Spelling Mean	Spelling S. D.	Total Score Mean	Total Score S. D.
4	FI	190	20.691	6.559	8.094	4.802	124.340	33.094
	PW	75	22.513	7.144	8.295	4.934	128.47	34.315
	PI	47	22.556	7.325	9.422	4.413	131.39	33.967
	MI	65	18.308	5.646	7.538	5.006	111.17	34.611
5	FI	186	24.888	6.554	11.417	5.599	154.77	32.733
	PW	70	28.071	6.697	12.057	5.930	174.36	35.160
	PI	34	28.029	6.003	11.912	5.490	156.85	31.915
	MI	56	24.589	5.559	12.018	5.331	148.89	37.750
6	FI	154	29.305	5.889	15.142	6.108	183.92	36.286
	PW	62	32.476	6.822	15.397	6.098	201.11	38.791
	PI	40	30.590	5.250	17.846	4.738	196.25	31.856
	MI	78	26.808	6.368	13.577	6.019	169.37	38.671
7	FI	184	31.212	8.135	12.473	6.192	155.48	39.659
	PW	41	39.195	9.017	15.650	5.566	199.62	43.481
	PI	17	33.438		15.938		177.00	
	MI	61	30.443	7.882	11.361	5.531	142.70	33.492
8	FI	148	34.162	8.374	14.662	6.153	181.46	43.778
	PW	50	42.000	8.391	17.920	5.692	218.30	48.943
	PI	17	39.588		20.235		223.39	
	MI	65	30.000	11.415	12.077	6.704	156.35	46.967
9	FI	58	36.741	7.915	16.914	6.639	206.91	41.731
	PW	44	46.318	9.680	19.395	6.165	257.91	55.403
	PI	19	42.684		20.684		242.39	
	MI	45	40.889	7.605	17.089	7.085	210.16	40.314
10	FI	91	47.495	9.251	12.011	4.872	189.45	41.617
	PW	32	47.441	11.305	10.676	4.656	217.15	58.688
	PI	15	42.077		15.308		231.42	
	MI	22	47.773		11.773		182.23	
11	FI	55	45.636	7.844	12.618	5.513	182.68	42.168
	PW	29	55.500	9.926	15.100	5.735	252.50	50.337
	PI	10	47.333		14.000		207.00	
	MI	15	46.200		11.267		186.50	
12	FI	31	50.065	6.792	14.258	4.878	214.18	44.158
	PW	17	62.294		18.235		280.00	33.816
	PI	4	57.500		15.750		230.50	
	MI	13	51.769		14.462		205.38	

TABLE C-2 (continued)

ALBUQUERQUE AREA

Grade	Race-School	N	Reading Vocabulary Mean	Reading Vocabulary S. D.	Reading Comprehension Mean	Reading Comprehension S. D.
4	FI	343	51.198	11.700	16.956	5.441
	PW	307	45.000	16.112	16.262	5.652
	PI	16	44.067		12.333	
	MI	38	47.405	10.159	15.378	4.418
5	FI	280	58.375	10.578	20.018	6.243
	PW	242	61.807	13.134	21.313	6.495
	PI	13	60.308		21.692	
	MI	51	54.245	11.323	18.020	5.861
6	FI	300	66.267	9.863	24.117	6.102
	PW	266	65.308	12.872	24.053	7.109
	PI	26	61.458		20.958	
	MI	66	58.780	13.446	21.576	6.904
7	FI	252	40.690	8.897	24.560	6.761
	PW	300	45.977	12.645	25.043	7.560
	PI	68	44.766	11.006	22.906	6.652
	MI	68	36.485	9.229	23.029	6.322
8	FI	234	46.936	9.177	27.150	5.756
	PW	316	50.323	14.018	28.630	8.798
	PI	47	47.957	12.186	26.681	7.619
	MI	56	45.125	9.561	25.214	6.704
9	FI	220	51.341	10.010	31.795	7.361
	PW	347	54.580	13.328	31.985	8.143
	PI	49	50.444	10.488	30.556	7.041
	MI	11	52.545		30.545	
10	FI	156	27.641	8.702	27.513	6.227
	PW	118	36.174	11.140	30.913	7.368
	PI	23	31.000		28.000	
	MI	12	34.583		28.250	
11	FI	122	29.582	8.866	31.057	5.725
	PW	75	38.818	12.923	32.844	6.509
	PI	22	29.368		25.421	
	MI	11	36.727		31.636	
12	FI	79	34.722	9.733	32.570	6.303
	PW	90	41.478	5.211	32.211	10.276
	PI	16	30.438		27.000	
	MI	13	42.769		32.538	

TABLE C-2 (Continued)

ALBUQUERQUE AREA

Grade	Race-School	N	Arithmetic Reasoning Mean	Arithmetic Reasoning S. D.	Arithmetic Fundamentals Mean	Arithmetic Fundamentals S. D.
4	FI	343	17.029	5.541	19.595	6.848
	PW	307	16.033	6.319	17.738	7.803
	PI	16	15.333		17.067	
	MI	38	15.243	5.166	17.135	6.920
5	FI	280	21.875	5.841	27.500	6.976
	PW	242	23.481	6.521	28.030	7.879
	PI	13	22.231		23.615	
	MI	51	18.122	5.329	24.347	5.783
6	FI	300	35.467	9.598	26.950	6.002
	PW	266	26.218	6.742	35.954	10.742
	PI	26	24.500		30.417	
	MI	66	13.441	6.826	31.322	8.533
7	FI	252	21.405	6.299	36.425	12.255
	PW	300	22.518	6.238	38.890	12.826
	PI	68	20.625	5.298	35.859	11.265
	MI	68	17.000	5.665	30.971	7.558
8	FI	234	24.735	6.502	43.560	12.526
	PW	316	26.256	8.710	45.038	14.328
	PI	47	23.915	6.129	38.809	11.815
	MI	56	30.304	5.743	33.964	11.104
9	FI	220	30.455	7.742	52.295	14.230
	PW	347	31.023	8.885	50.207	14.772
	PI	49	29.000	7.717	49.333	14.244
	MI	11	33.091		42.273	
10	FI	156	23.763	8.994	43.955	14.318
	PW	118	27.826	9.006	43.174	14.100
	PI	23	25.522		37.000	
	MI	12	23.583		38.333	
11	FI	122	28.107	8.708	48.721	13.107
	PW	75	34.143	9.714	47.779	16.465
	PI	22	22.895		33.263	
	MI	11	23.182		38.364	
12	FI	79	27.506	8.110	48.139	12.783
	PW	90	28.867	12.582	48.400	9.966
	PI	16	22.000		42.750	
	MI	13	22.615		37.308	

TABLE C-2 (continued)

ALBUQUERQUE AREA

	Race-		Language		Spelling		Total Score	
Grade	School	N	Mean	S. D.	Mean	S. D.	Mean	S. D.
4	FI	343	24.522	6.193	11.227	5.345	140.058	30.569
	PW	307	25.262	6.584	9.957	4.955	142.664	49.900
	PI	16	24.000		9.000		133.833	
	MI	38	24.027	5.331	10.432	5.183	128.824	24.556
5	FI	280	27.375	6.332	13.696	5.838	168.607	32.317
	PW	242	30.906	5.677	13.597	5.420	177.976	51.973
	PI	13	33.231		14.846		168.667	
	MI	51	25.673	5.570	12.388	6.020	151.847	25.106
6	FI	300	31.367	6.223	16.980	5.873	209.338	35.202
	PW	266	31.601	6.126	15.281	6.032	200.013	56.966
	PI	26	30.417		15.375		186.166	
	MI	66	28.695	6.202	16.407	6.719	188.837	54.716
7	FI	252	34.718	7.643	13.644	5.890	171.761	37.627
	PW	300	37.452	8.682	13.741	6.580	181.256	53.734
	PI	68	34.906	8.814	14.302	5.685	174.969	48.088
	MI	68	35.162	7.426	12.279	5.531	155.088	30.019
8	FI	234	38.517	7.734	17.292	6.193	198.148	37.023
	PW	316	41.747	10.035	15.780	7.127	209.453	70.501
	PI	47	39.660	7.792	17.170	6.393	192.000	54.676
	MI	56	38.607	7.142	17.161	5.053	180.750	34.723
9	FI	220	41.523	7.892	18.955	6.520	229.598	59.720
	PW	347	45.236	8.977	18.303	6.395	231.439	63.144
	PI	49	40.889	8.521	19.156	6.356	216.944	54.488
	MI	11	43.364		12.636		224.500	
10	FI	156	45.045	8.455	9.462	4.529	175.929	50.545
	PW	118	52.609	9.439	11.626	4.362	202.065	56.707
	PI	23	48.391		11.609		176.239	
	MI	12	49.083		17.083		191.167	
11	FI	122	48.311	7.124	11.361	5.078	190.731	50.444
	PW	75	56.091	10.154	14.130	4.929	218.218	66.788
	PI	22	45.474		10.579		153.447	
	MI	11	51.727		15.273		205.409	
12	FI	79	50.924	8.498	12.684	5.213	208.987	55.283
	PW	90	54.900	7.384	13.900	12.161	219.80	62.471
	PI	16	46.313		11.750		193.250	
	MI	13	56.846		16.846		208.346	

TABLE C-2 (continued)

ABERDEEN AREA

	Race-		Reading Vocabulary		Reading Comprehension	
Grade	School	N	Mean	S. D.	Mean	S. D.
4	FI	505	51.533	13.088	15.956	5.415
	PW	298	60.708	13.672	20.493	6.538
	PI	111	55.775	13.877	17.027	6.259
	MI	148	53.209	14.613	16.318	6.006
5	FI	476	60.279	12.543	19.351	5.150
	PW	316	69.649	11.858	24.949	6.950
	PI	104	61.971	12.360	21.231	6.529
	MI	148	59.243	12.869	20.331	6.307
6	FI	459	67.044	12.251	23.449	6.201
	PW	280	75.579	11.402	28.411	6.426
	PI	105	67.105	12.677	24.324	6.449
	MI	142	70.514	11.614	24.176	5.608
7	FI	431	43.378	12.040	24.434	6.948
	PW	294	51.660	12.143	29.595	8.307
	PI	95	48.274	12.331	25.853	6.936
	MI	127	46.252	12.203	26.331	6.058
8	FI	417	50.058	11.106	27.501	6.165
	PW	268	54.907	12.525	32.854	8.213
	PI	69	53.594	12.508	29.841	7.950
	MI	104	51.635	11.295	28.163	6.682
9	FI	300	54.093	12.438	30.633	7.264
	PW	305	63.456	10.455	37.938	7.875
	PI	62	59.274	12.374	32.387	7.904
	MI	96	56.729	9.012	30.927	8.291
10	FI	238	31.101	8.985	27.697	6.250
	PW	317	40.249	11.871	33.350	7.160
	PI	87	33.161	11.415	27.609	7.202
	MI	67	37.060	10.580	29.881	6.962
11	FI	169	34.148	10.091	29.953	6.339
	PW	263	46.863	12.734	34.741	6.657
	PI	57	36.193	11.148	30.140	7.087
	MI	51	40.451	11.069	33.078	6.138
12	FI	152	39.414	10.571	33.033	6.520
	PW	255	47.851	12.774	36.616	6.728
	PI	43	43.465	12.940	33.093	6.750
	MI	40	47.625	12.537	36.125	6.065

TABLE C-2 (continued)

ABERDEEN AREA

Grade	Race-School	N	Arithmetic Reasoning		Arithmetic Fundamentals	
			Mean	S. D.	Mean	S. D.
4	FI	505	16.091	5.851	19.746	7.081
	PW	298	19.815	6.185	20.916	6.503
	PI	111	17.955	6.050	18.838	6.612
	MI	148	16.392	5.561	15.243	7.317
5	FI	476	21.527	6.030	25.931	6.667
	PW	316	25.500	6.068	30.585	7.173
	PI	104	22.615	6.969	26.827	7.604
	MI	148	21.959	6.472	24.872	8.435
6	FI	459	25.806	6.396	33.194	9.221
	PW	280	30.386	6.239	41.611	10.951
	PI	105	26.171	6.366	34.390	10.877
	MI	142	25.739	5.756	34.204	8.181
7	FI	431	20.805	6.187	33.176	11.826
	PW	294	24.844	6.692	44.806	13.174
	PI	95	21.400	5.983	36.716	11.992
	MI	127	22.220	5.510	36.520	11.743
8	FI	417	23.731	6.697	40.520	13.160
	PW	268	29.526	7.744	51.265	14.316
	PI	69	25.043	7.867	42.768	14.978
	MI	104	26.231	8.324	43.298	14.822
9	FI	300	27.273	7.973	45.753	14.481
	PW	305	37.279	8.249	57.603	13.561
	PI	62	32.065	8.757	46.339	14.868
	MI	96	31.417	9.529	46.219	16.386
10	FI	238	23.933	7.361	44.706	14.602
	PW	317	33.874	9.036	53.508	13.135
	PI	87	26.034	9.191	40.966	14.685
	MI	67	29.149	8.038	44.806	16.111
11	FI	169	25.249	8.640	43.828	14.412
	PW	263	33.513	8.821	52.297	12.823
	PI	57	24.754	7.965	40.281	11.927
	MI	51	27.922	8.385	44.157	15.557
12	FI	152	27.336	7.863	44.178	13.469
	PW	255	34.467	9.607	52.580	13.339
	PI	43	29.186	10.780	43.023	14.701
	MI	40	32.075	11.203	48.825	16.709

TABLE C-2 (continued)

ABERDEEN AREA

Grade	Race-School	N	Language Mean	Language S. D.	Spelling Mean	Spelling S. D.	Total Score Mean	Total Score S. D.
4	FI	505	21.280	5.686	9.704	4.801	134.423	32.309
	PW	298	27.460	6.335	11.678	5.353	161.081	35.013
	PI	111	24.910	6.399	10.640	5.222	145.144	33.133
	MI	148	25.000	6.116	10.297	5.729	136.561	34.839
5	FI	476	25.172	5.385	12.807	5.780	165.078	32.069
	PW	316	30.943	5.682	15.576	5.867	196.873	35.788
	PI	104	26.346	6.298	13.981	5.956	173.067	36.724
	MI	148	29.007	5.414	14.162	6.104	169.365	34.732
6	FI	459	27.808	6.043	15.819	6.025	193.170	37.534
	PW	280	33.343	5.857	17.707	5.728	227.193	38.117
	PI	105	29.810	5.859	17.371	5.563	199.171	39.132
	MI	142	30.070	5.469	17.648	5.339	202.373	31.655
7	FI	431	32.485	8.164	14.466	6.633	168.761	40.999
	PW	294	40.755	9.877	15.534	6.186	206.867	47.470
	PI	95	36.758	8.475	16.600	6.726	185.926	41.074
	MI	127	35.780	7.605	16.197	6.005	183.142	38.234
8	FI	417	35.791	7.738	17.060	6.669	194.698	40.343
	PW	268	43.239	8.780	17.612	6.312	229.302	47.978
	PI	69	40.420	8.889	19.101	7.725	210.913	49.373
	MI	104	40.808	8.801	19.183	5.999	209.317	42.062
9	FI	300	39.393	7.955	19.577	6.855	216.890	47.145
	PW	305	47.830	8.305	20.767	5.939	264.872	44.982
	PI	62	42.387	7.025	21.887	5.341	234.339	47.020
	MI	96	42.281	7.771	18.854	6.361	226.427	46.749
10	FI	238	45.832	9.456	12.160	5.104	185.429	41.726
	PW	317	54.694	9.921	13.063	5.108	228.972	46.367
	PI	87	46.356	9.613	12.103	4.539	186.138	47.930
	MI	67	52.090	10.224	13.045	4.775	206.030	46.102
11	FI	169	47.982	8.742	12.888	5.121	194.047	43.736
	PW	263	58.278	9.342	14.958	5.500	240.548	46.405
	PI	57	49.561	10.068	14.684	5.764	195.649	44.164
	MI	51	55.118	9.442	12.510	5.540	213.451	42.727
12	FI	152	51.368	8.919	14.862	5.318	210.684	42.494
	PW	255	57.910	9.340	15.573	5.526	245.302	46.095
	PI	43	55.256	10.466	15.395	5.564	219.814	51.804
	MI	40	61.300	10.525	16.750	4.840	242.325	53.212

TABLE C-2 (continued)

BILLINGS AREA

	Race-		Reading Vocabulary		Reading Comprehension	
Grade	School	N	Mean	S. D.	Mean	S. D.
4	FI	44	47.000	15.017	15.306	5.117
	PW	155	55.858	16.075	19.316	6.958
	PI	206	49.350	15.023	15.597	5.508
	MI	44	43.878	18.166	13.829	4.868
5	FI	57	58.636	11.700	19.490	4.092
	PW	164	66.896	13.975	24.799	6.478
	PI	172	64.209	11.883	21.663	5.677
	MI	52	56.558	15.646	19.000	5.303
6	FI	33	60.147	15.495	21.176	5.697
	PW	151	72.550	12.514	28.464	6.780
	PI	153	68.314	11.979	24.275	6.408
	MI	57	65.491	11.194	20.982	6.730
7	FI	28	39.214		21.964	
	PW	129	52.876	13.000	30.550	8.673
	PI	197	45.218	12.037	25.147	6.287
	MI	50	36.900	13.019	22.100	6.864
8	FI	13	42.000		25.385	
	PW	107	56.383	13.364	33.626	8.391
	PI	129	50.481	12.562	27.907	7.661
	MI	30	41.167	14.258	24.300	6.809
9	FI	11	43.091		27.818	
	PW	82	62.279	10.710	37.220	7.916
	PI	70	54.914	10.630	31.229	6.908
	MI	30	54.121	13.019	30.091	6.569
10	FI	7	35.625		28.125	
	PW	84	40.833	12.178	32.881	7.400
	PI	53	35.792	12.000	30.792	7.984
	MI	20	26.650		24.700	
11	FI	2				
	PW	87	47.103	12.186	36.011	6.384
	PI	35	39.571	12.806	33.000	7.643
	MI	12	34.500		30.333	
12	FI	2				
	PW	69	49.145	13.565	36.232	7.438
	PI	34	41.588	14.314	33.324	7.125
	MI	11	40.636		31.909	

TABLE C-2 (continued)

ANADARKO AREA

Grade	Race-School	N	Reading Vocabulary Mean	Reading Vocabulary S. D.	Reading Comprehension Mean	Reading Comprehension S. D.
4	FI	53	49.264	16.643	16.604	7.016
	PI	31	63.161	11.091	21.097	4.973
	PW	125	64.192	10.742	20.568	6.360
5	FI	61	60.246	14.223	21.869	6.245
	PI	39	67.026	10.526	22.513	5.551
	PW	143	70.147	11.345	26.021	6.709
6	FI	55	65.909	13.498	24.345	6.754
	PI	24	69.625	13.172	25.583	5.393
	PW	114	73.368	10.412	27.649	6.686
7	FI	108	42.907	11.954	25.259	6.064
	PI	35	47.086	12.795	25.886	6.255
	PW	110	53.273	12.145	30.391	8.255
8	FI	129	49.558	11.606	29.101	6.329
	PI	33	53.061	10.606	28.697	7.956
	PW	165	56.927	11.815	31.927	8.299
9	FI	231	53.714	10.789	31.684	6.699
	PI	37	59.892	8.705	33.676	5.366
	PW	164	59.567	11.688	35.274	8.112
10	FI	317	31.191	10.607	28.083	6.577
	PI	20	34.600	10.658	29.700	5.542
	PW	153	38.221	11.671	31.844	7.272
11	FI	256	36.291	12.166	31.153	6.916
	PI	25	37.000	9.789	30.120	10.710
	PW	158	39.234	10.368	32.304	7.900
12	FI	218	38.766	12.466	32.649	7.167
	PI	16	41.000	8.216	35.688	3.635
	PW	123	44.967	11.476	34.309	8.041

TABLE C-2 (continued)

BILLINGS AREA

Grade	Race-School	N	Language		Spelling		Total Score	
			Mean	S. D.	Mean	S. D.	Mean	S. D.
4	FI	44	21.245	6.105	8.143	4.397	128.163	34.449
	PW	155	24.658	7.063	10.432	5.707	147.194	38.216
	PI	206	21.578	6.070	9.160	5.036	128.228	32.817
	MI	44	18.220	6.259	8.878	5.715	116.805	37.578
5	FI	57	25.782	5.513	13.200	5.410	164.745	25.956
	PW	164	30.280	6.387	15.110	5.785	190.805	38.853
	PI	172	27.395	5.553	14.151	5.914	176.023	33.809
	MI	52	23.135	6.768	11.827	6.367	153.692	35.475
6	FI	33	26.706	5.718	12.765	5.805	175.353	40.032
	PW	151	33.344	5.742	17.748	5.652	221.272	39.452
	PI	153	29.405	5.857	15.830	5.674	199.229	37.115
	MI	57	26.385	6.100	15.509	6.533	181.053	36.685
7	FI	28	28.679		12.964		143.071	
	PW	129	40.147	8.774	16.333	6.051	213.155	45.705
	PI	197	33.279	7.862	14.929	6.089	176.543	39.788
	MI	50	28.280	8.949	13.600	6.389	145.940	40.437
8	FI	13	29.923		13.615		161.231	
	PW	107	44.028	8.978	17.766	6.423	237.869	53.570
	PI	129	39.008	8.834	17.093	6.402	203.388	44.481
	MI	30	30.030	8.116	13.167	7.003	161.333	46.342
9	FI	11	29.727		13.636		170.000	
	PW	82	49.000	8.498	20.256	6.073	268.695	45.498
	PI	70	42.071	8.343	18.914	6.047	223.457	45.275
	MI	30	36.818	9.560	19.818	7.401	208.667	49.311
10	FI	7	42.125		13.250		177.625	
	PW	84	52.631	9.526	11.595	5.223	224.167	45.133
	PI	53	49.528	9.858	12.585	4.850	207.377	55.641
	MI	20	41.950		11.100		158.050	
11	FI	2						
	PW	87	59.690	9.174	15.092	5.374	248.436	45.736
	PI	35	52.229	8.755	13.629	5.319	215.086	50.168
	MI	12	47.917		15.167		180.667	
12	FI	2						
	PW	69	59.290	9.247	17.383	5.320	248.870	47.612
	PI	34	53.853	12.161	13.500	6.784	220.294	59.931
	MI	11	50.727		15.636		201.091	

TABLE C-2 (continued)

BILLINGS AREA

	Race-		Arithmetic Reasoning		Arithmetic Fundamentals	
Grade	School	N	Mean	S. D.	Mean	S. D.
4	FI	44	15.980	6.200	20.306	6.590
	PW	155	17.743	6.666	19.187	6.156
	PI	206	15.078	6.115	17.466	6.530
	MI	44	13.683	6.875	18.317	7.656
5	FI	57	21.860	4.915	26.073	5.544
	PW	164	25.024	6.558	28.720	7.737
	PI	172	22.192	6.421	26.238	7.096
	MI	52	19.576	6.969	23.596	5.732
6	FI	33	23.529	6.087	31.029	10.392
	PW	151	29.993	5.585	39.172	10.188
	PI	153	26.575	7.113	34.830	9.374
	MI	57	22.280	6.904	27.105	9.424
7	FI	28	17.143		23.107	
	PW	129	27.109	7.237	46.140	11.216
	PI	197	21.487	6.249	36.340	12.598
	MI	50	16.200	5.743	28.860	10.421
8	FI	13	20.846		29.462	
	PW	107	32.972	9.270	53.093	15.643
	PI	129	26.039	7.277	42.860	12.579
	MI	30	18.133	7.282	34.267	12.598
9	FI	11	22.364		33.364	
	PW	82	38.963	7.557	60.463	12.876
	PI	70	29.500	8.239	46.829	14.269
	MI	30	26.758	7.133	41.061	15.251
10	FI	7	23.125		35.375	
	PW	84	34.798	8.100	51.500	12.685
	PI	53	30.038	11.406	48.642	16.447
	MI	20	20.150		33.500	
11	FI	2				
	PW	87	36.586	8.967	53.954	12.712
	PI	35	28.629	9.579	48.029	14.107
	MI	12	20.500		32.250	
12	FI	2				
	PW	69	35.899	10.281	53.188	12.490
	PI	34	30.265	10.569	47.765	16.094
	MI	11	22.909		39.273	

TABLE C-2 (continued)

ANADARKO AREA

			Arithmetic Reasoning		Arithmetic Fundamentals	
Grade	Race-School	N	Mean	S. D.	Mean	S. D.
4	FI	53	16.189	6.435	18.547	6.962
	PI	31	19.290	5.681	16.645	6.567
	PW	125	19.616	5.958	17.640	6.408
5	FI	61	22.738	6.245	28.148	6.618
	PI	39	23.513	5.551	26.513	6.563
	PW	143	25.930	6.709	27.937	7.080
6	FI	55	24.564	6.436	31.527	9.346
	PI	24	26.458	5.795	31.083	6.831
	PW	114	28.947	5.073	36.447	8.835
7	FI	108	20.815	6.136	34.213	12.398
	PI	35	23.543	5.709	34.857	10.383
	PW	110	26.282	6.584	40.873	14.547
8	FI	129	26.512	7.479	43.419	13.217
	PI	33	27.152	5.827	43.636	13.885
	PW	165	31.158	7.743	52.539	14.690
9	FI	231	30.723	8.023	48.416	15.133
	PI	37	35.432	6.611	52.405	18.631
	PW	164	37.171	8.736	56.774	16.679
10	FI	317	25.280	7.828	41.877	14.265
	PI	20	31.150	8.392	48.550	10.747
	PW	153	33.987	9.269	52.669	13.853
11	FI	256	28.052	8.777	43.321	14.381
	PI	25	30.880	9.245	45.520	18.111
	PW	158	33.753	9.285	52.304	15.643
12	FI	218	28.212	8.215	44.748	14.100
	PI	16	31.813	8.812	49.500	13.206
	PW	123	36.016	9.356	51.878	16.316

TABLE C-2 (continued)

ANADARKO AREA

Grade	Race-School	N	Language Mean	Language S. D.	Spelling Mean	Spelling S. D.	Total Score Mean	Total Score S. D.
4	FI	53	22.623	6.696	10.962	5.941	134.188	42.907
	PI	31	27.419	5.363	13.613	5.135	161.225	30.465
	PW	125	28.376	6.499	12.144	5.430	162.576	31.244
5	FI	61	29.131	6.107	15.279	5.954	177.573	38.497
	PI	39	28.077	4.864	13.974	5.732	181.871	28.068
	PW	143	30.734	5.834	14.503	5.506	195.272	34.467
6	FI	55	29.618	6.953	16.418	5.957	192.381	41.267
	PI	24	30.583	6.614	17.000	6.144	200.166	35.749
	PW	114	32.061	6.088	16.500	5.974	214.973	34.161
7	FI	108	35.592	10.174	15.074	6.578	173.953	41.509
	PI	35	41.486	8.579	16.457	6.566	189.914	39.332
	PW	110	43.945	8.872	15.891	5.739	210.654	43.255
8	FI	129	40.318	8.336	17.403	6.220	206.294	43.047
	PI	33	42.030	7.234	18.545	6.986	213.121	35.763
	PW	165	45.055	8.708	17.255	6.093	234.981	46.979
9	FI	231	42.372	7.851	19.013	6.470	226.138	44.565
	PI	37	45.865	6.278	21.622	4.433	248.891	37.216
	PW	164	48.024	8.916	19.189	5.984	256.000	49.275
10	FI	317	46.575	9.360	12.062	4.918	185.095	42.184
	PI	20	51.400	8.218	13.050	4.706	208.450	36.346
	PW	153	54.156	10.407	12.201	4.879	223.142	46.228
11	FI	256	50.504	10.095	13.220	6.326	202.582	47.128
	PI	25	56.560	7.865	13.800	5.720	213.880	48.611
	PW	158	56.551	11.000	13.690	4.707	227.835	46.476
12	FI	218	52.554	10.134	14.423	5.472	211.175	46.217
	PI	16	58.438	5.454	13.625	4.567	230.062	30.277
	PW	123	58.154	10.668	13.894	5.444	239.162	50.289

TABLE C-2 (continued)

MUSKOGEE AREA

Grade	Race-School	N	Reading Vocabulary Mean	Reading Vocabulary S. D.	Reading Comprehension Mean	Reading Comprehension S. D.
4	FI	120	54.767	14.107	17.033	6.114
	PI	69	44.797	14.064	17.406	4.550
	PW	170	50.294	15.846	16.984	6.129
5	FI	89	56.135	11.446	19.135	5.974
	PI	81	57.617	14.325	20.864	5.480
	PW	196	61.995	12.661	22.801	5.924
6	FI	112	63.500	11.866	22.527	6.809
	PI	87	65.828	16.180	24.586	6.967
	PW	195	71.379	12.590	25.646	7.212
7	FI	112	40.634	11.891	23.768	6.608
	PI	59	46.746	10.354	25.831	6.426
	PW	141	46.780	14.318	25.440	8.552
8	FI	108	47.194	11.437	27.454	7.270
	PI	54	52.593	12.779	28.519	7.941
	PW	143	53.021	13.149	30.434	8.091
9	FI	119	51.404	12.260	29.454	7.822
	PI	79	49.418	11.756	27.076	8.320
	PW	283	54.890	13.454	31.951	8.581
10	FI	53	29.623	8.603	28.679	6.799
	PI	48	34.521	9.242	29.292	5.989
	PW	249	34.201	9.954	29.502	6.622
11	FI	30	33.433	7.187	29.200	5.986
	PI	35	37.686	12.486	30.686	8.434
	PW	165	41.418	11.760	32.915	7.077
12	FI	31	33.419	8.246	31.839	5.049
	PI	21	39.810	14.029	32.190	9.085
	PW	172	42.174	12.377	33.448	7.009

TABLE C-2 (continued)

MUSKOGEE AREA

Grade	Race-School	N	Arithmetic Reasoning Mean	Arithmetic Reasoning S. D.	Arithmetic Fundamentals Mean	Arithmetic Fundamentals S. D.
4	FI	120	16.967	6.182	20.142	7.212
	PI	69	17.389	5.069	17.855	5.893
	PW	170	18.224	5.963	19.624	7.010
5	FI	89	20.876	5.839	25.404	7.104
	PI	81	22.494	5.573	25.667	6.910
	PW	196	23.821	6.633	26.755	8.278
6	FI	112	24.616	5.868	34.009	9.696
	PI	87	26.598	6.934	37.011	11.171
	PW	195	28.303	6.541	40.379	10.899
7	FI	112	18.830	5.868	32.330	11.636
	PI	59	22.559	4.862	37.051	11.109
	PW	141	23.092	6.092	40.135	13.561
8	FI	108	22.667	7.508	42.778	15.218
	PI	54	25.130	7.331	41.722	15.821
	PW	143	26.902	7.222	45.923	14.314
9	FI	119	27.000	8.939	45.782	16.137
	PI	79	28.000	8.116	45.215	14.802
	PW	283	32.081	8.820	49.035	15.372
10	FI	53	22.962	7.425	42.170	13.430
	PI	48	29.833	10.104	48.333	15.735
	PW	249	30.281	9.120	49.181	14.843
11	FI	30	21.333	6.930	39.967	12.689
	PI	35	31.400	10.223	46.314	16.383
	PW	165	33.182	9.300	50.927	13.424
12	FI	31	27.645	6.851	46.387	11.593
	PI	21	29.857	10.812	44.619	17.349
	PW	172	32.465	9.738	49.250	16.090

TABLE C-2(continued)

MUSKOGEE AREA

			Language		Spelling		Total Score	
Grade	Race-School	N	Mean	S. D.	Mean	S. D.	Mean	S. D.
4	FI	120	25.725	6.971	10.517	6.098	145.100	37.842
	PI	69	24.783	6.024	10.928	4.298	133.304	29.490
	PW	170	24.735	6.982	10.147	5.581	140.047	35.440
5	FI	89	26.483	5.434	12.124	5.177	160.472	31.550
	PI	81	28.852	6.138	14.012	6.267	169.481	34.044
	PW	196	30.265	5.599	12.735	6.737	178.372	34.569
6	FI	112	29.134	6.796	16.089	6.302	190.036	37.881
	PI	87	31.310	7.550	16.517	6.322	202.126	47.938
	PW	195	31.272	6.498	15.969	6.269	213.082	32.202
7	FI	112	33.393	9.058	13.348	6.347	163.045	41.713
	PI	59	37.441	7.513	15.254	6.052	184.881	36.387
	PW	141	38.957	9.270	14.106	6.513	188.581	49.020
8	FI	108	37.093	7.925	16.380	5.679	193.037	43.000
	PI	54	40.204	11.063	15.537	7.781	204.074	52.602
	PW	143	42.685	8.670	15.986	7.497	214.951	48.260
9	FI	119	40.664	9.174	19.109	6.398	213.513	51.527
	PI	79	40.759	10.483	17.747	7.088	208.468	50.498
	PW	283	45.018	8.564	18.102	6.752	231.042	50.725
10	FI	53	52.434	10.271	12.887	5.357	188.755	41.449
	PI	48	54.208	9.323	13.417	5.082	209.604	44.340
	PW	249	53.337	10.872	11.169	4.781	207.671	46.357
11	FI	30	56.333	6.605	13.100	4.384	193.367	33.690
	PI	35	55.743	10.090	13.429	6.504	214.057	56.258
	PW	165	56.576	10.517	13.509	5.380	228.527	46.594
12	FI	31	59.452	6.704	15.613	4.368	214.355	31.520
	PI	21	55.714	13.353	15.048	6.121	217.238	62.881
	PW	172	54.186	14.181	13.058	6.251	224.581	52.896

TABLE C-3
DIFFERENCES BETWEEN MEAN SCORES OF RACE-SCHOOL GROUPS ACCORDING TO GRADE LEVEL IN EACH AREA - PHOENIX AREA, 1951

Grade	Race-School	Read. Voc.	Read. Comp.	Arith. Reas.	Arith. Fund.	Lang.	Spell.	Total Score
4	FI-PW	-2.947	-.840	-.208	2.243*	-1.822	-.201	-4.130
	FI-PI	-3.737	-.541	.023	1.879	-1.865	-1.328	-7.05
	FI-MI	3.938	1.545*	1.587	3.820*	2.383*	.556	13.17*
	PW-PI	-.790	.299	.231	-.364	-.043	-1.127	-2.92
	PW-MI	6.885*	2.385*	1.795	1.577	4.205*	.757	17.30*
	PI-MI	7.675*	2.086*	1.564	1.941	4.248*	1.884*	20.22*
5	FI-PW	-6.481	-3.662*	-3.880*	-1.370	-3.183*	-.640	-19.59*
	FI-PI	2.233	.775	-1.645	-1.337	-3.144*	-.495	-2.08
	FI-MI	3.394	1.106	1.549	3.201*	.299	-.601	5.88
	PW-PI	8.714*	4.437*	2.235	.033	.042	.145	17.51*
	PW-MI	9.875*	4.768*	5.429*	4.571*	3.482*	.039	25.47*
	PI-MI	1.161	.331	3.194*	4.538*	3.440*	-.106	7.96
6	FI-PW	-2.471	-3.370*	-4.109*	-3.485*	-3.171*	-.255	-17.19*
	FI-PI	-2.959	-3.144*	-1.679	-1.305	-1.285	-2.704*	-12.33*
	FI-MI	5.053*	1.984*	1.205	1.579	2.497*	1.565	14.55*
	PW-PI	-.488	.226	2.430	2.180	1.886	-2.449*	4.86
	PW-MI	7.524*	5.354*	5.314*	5.064*	5.668*	1.820	31.74*
	PI-MI	8.012*	5.128*	2.884*	2.884	3.782*	4.269*	26.88*
7	FI-PW	-10.263*	-7.829*	-7.249	-8.470*	-7.983*	-3.177*	-44.14*
	FI-PI	-3.911	-4.237	-4.498	-5.549	-2.226	-3.465	-21.52
	FI-MI	2.988	1.935*	-.056	4.783*	.769	1.112	12.78*
	PW-PI	6.352	3.592	2.751	2.921	5.757	-.288	22.62
	PW-MI	13.251*	9.764*	7.193*	13.253*	8.752*	4.289*	56.92*
	PI-MI	6.899	6.172	4.442	10.332	2.995	4.577	34.30
8	FI-PW	-5.277*	-4.304*	-4.223*	-7.593*	-7.838	-3.258*	-36.84*
	FI-PI	-7.159	-5.892	-7.458	-13.169	-5.426	-5.573	-41.93
	FI-MI	11.108*	4.081*	-4.685*	3.238	4.162*	2.585*	25.11*
	PW-PI	-1.882	-1.588	-3.235	-5.576	2.412	-2.315	-5.09
	PW-MI	16.385*	8.385*	-.462	10.831*	12.000*	5.843*	61.95*
	PI-MI	18.267	9.973	2.773	16.407	9.588	8.158	67.04
9	FI-PW	-13.433*	-6.042*	-9.263*	-9.604*	-9.577*	-2.481	-51.00*
	FI-PI	-10.358	-4.935	-7.751	-6.777	-5.943	-3.770	-35.48
	FI-MI	-3.680	.609	2.717	1.772	-4.148*	-.175	-3.25
	PW-PI	3.075	1.107	1.512	2.827	3.634	-1.289	15.52
	PW-MI	9.753*	6.651*	11.980*	11.376*	5.429*	2.306	47.75*
	PI-MI	6.678	5.544	10.468	8.549	1.795	3.595	32.23
10	FI-PW	-10.446*	-1.645	-31.459*	-7.173*	.054	1.335	-27.70*
	FI-PI	-13.758	-4.296	-11.308	-8.099	5.418	-3.297	41.97
	FI-MI	2.092	5.428	3.514	-4.518	-.278	.238	7.22
	PW-PI	3.312	-2.651	20.151	-.926	5.364	-4.632	-14.27
	PW-MI	12.538	7.073	34.973	2.655	-.332	-1.097	34.92
	PI-MI	15.850	9.724	14.822	3.581	5.696	3.535	49.19
11	FI-PW	-17.455*	-7.964*	-14.697*	-17.182*	-9.864*	-2.482	-69.82*
	FI-PI	-6.677	-2.192	-7.697	-6.849	-1.697	-1.382	-24.32
	FI-MI	-.722	-.036	-1.631	-2.049	-.564	1.351	-3.82
	PW-PI	10.778	5.777	7.000	10.333	8.167	1.100	45.50
	PW-MI	16.733	7.933	13.066	15.133	9.300	3.833	66.00
	PI-MI	5.955	2.156	6.066	4.800	1.133	2.733	20.50
12	FI-PW	-18.878	-6.370	-13.624	-13.368	-12.229	-3.977	-65.82
	FI-PI	-6.790	1.306	.008	-3.339	-7.435	-1.492	-16.32
	FI-MI	.941	.806	6.027	2.853	-1.704	-.204	8.80
	PW-PI	12.088	7.676	13.632	10.029	4.794	2.485	49.50
	PW-MI	19.819	7.176	19.651	16.221	10.525	3.773	74.62
	PI-MI	7.731	-.500	6.019	6.192	5.731	1.288	25.12

*Significant at or beyond the .05 level of confidence

TABLE C-3 (continued)
ALBUQUERQUE AREA, 1951

Grade	Race-School	Read. Voc.	Read. Comp.	Arith. Reas.	Arith. Fund.	Lang.	Spell.	Total Score
4	FI-PW	6.198*	.694	.996*	1.857*	-.740	1.270*	-2.606
	FI-PI	7.131	4.623	1.696	2.528	.522	2.227	6.225
	FI-MI	3.793*	1.578*	1.786*	2.460*	.495	.795	11.234*
	PW-PI	.933	3.929	.700	.671	1.262	.957	8.831
	PW-MI	-2.405	.884	.790	.603	1.235	-.475	13.840*
	PI-MI	-3.338	-3.045	.090	-.068	-.027	-1.432	5.009
5	FI-PW	-3.432*	-1.295*	-1.606*	-.530	-3.531*	.099	-9.369*
	FI-PI	-1.933	-1.674	-.356	3.885	-5.856	-1.150	-.060
	FI-MI	4.130*	1.998*	3.753*	3.153*	1.702	1.308	16.760*
	PW-PI	1.499	-.379	1.250	4.415	-2.325	-1.249	9.309
	PW-MI	7.562*	3.293*	5.359*	3.683*	5.233*	1.209	26.129*
	PI-MI	6.063	3.672	4.109	-.732	7.558	2.458	16.820
6	FI-PW	.959	.064	9.249	-9.004	-.234	1.699*	9.325*
	FI-PI	4.809	3.159	10.967	-3.467	.950	1.605	23.172
	FI-MI	7.487*	2.541*	22.026*	-4.372*	2.672*	.573	20.501*
	PW-PI	3.850	3.095	1.718	5.537	1.184	-.094	13.847
	PW-MI	6.528*	2.477*	12.777*	4.632*	2.906*	-1.126	11.176
	PI-MI	2.678	.618	11.059	-.905	1.722	-1.032	-2.671
7	FI-PW	-5.287*	-.483	-1.113*	-2.465	-2.734*	-.097	-9.495*
	FI-PI	-4.076*	1.654	.780	.566	-0.188	-.658	-3.208
	FI-MI	4.205*	1.531	4.405*	5.454*	-0.444	1.365	16.673*
	PW-PI	1.211	2.137*	1.893*	3.031	2.546	-.561	6.287
	PW-MI	9.492*	2.014*	5.518*	7.919*	2.290*	1.462	26.168*
	PI-MI	8.281*	-.123	3.625*	4.888*	0.256	2.023*	19.881*
8	FI-PW	-3.387*	-1.480*	-1.521*	-1.478	-3.230*	1.512*	-11.305*
	FI-PI	-1.021	.469	.820	4.751*	-1.143	.122	6.148
	FI-MI	1.811	1.936*	-5.569*	9.596*	-0.090	.131	17.398
	PW-PI	2.366	1.949	2.341*	6.229*	2.000	-1.390	17.453*
	PW-MI	5.198*	3.416*	-4.048*	11.074*	3.141*	-1.381	28.703*
	PI-MI	2.832	1.467	-6.389*	4.845*	1.000	.009	11.250*
9	FI-PW	-3.239*	-.190	-.568	2.088	-3.713*	.652	-1.841
	FI-PI	.897	1.239	1.455	2.962	.634	-.201	12.654
	FI-MI	-1.204	1.250	-2.636	10.022	-1.841	6.319	5.098
	PW-PI	4.136*	1.429	2.023	.874	4.347*	-.853	14.495
	PW-MI	2.035	1.440	-2.068	7.934	1.872	5.667	6.939
	PI-MI	2.101	.011	-4.091	7.060	-2.475	6.520	-7.556
10	FI-PW	-8.533*	-3.400*	-4.063*	.781	-7.564*	-2.164*	-26.136*
	FI-PI	-3.359	-.487	-1.759	6.955	-3.346	-2.147	-.310
	FI-MI	-6.942	-.737	.180	5.622	-4.038	-7.621	-15.238
	PW-PI	5.174	2.913	2.304	6.174	4.218	.017	25.826
	PW-MI	1.591	2.663	4.243	4.841	3.526	-5.457	10.898
	PI-MI	-3.583	-.250	1.939	-1.333	-.692	5.474	-14.928
11	FI-PW	-9.236*	-1.787*	-6.036	.942	-7.780*	-2.769*	-27.487*
	FI-PI	.214	5.636	5.212	15.458	2.837	.782	37.284
	FI-MI	-7.145	-.579	4.925	10.357	-3.416	-3.912	-14.678
	PW-PI	9.450	7.423	11.248	14.516	10.617	3.551	64.771
	PW-MI	2.091	1.208	10.961	9.415	4.364	-1.143	12.809
	PI-MI	-7.359	-6.215	-.287	-5.101	-6.253	-4.694	-51.962
12	FI-PW	20.822*	-22.319	-20.827	19.139	18.424*	-29.038	-16.599
	FI-PI	4.284	5.570	5.506	5.389	4.611	.934	15.737
	FI-MI	-8.047	.032	4.891	10.831	-5.922	-4.162	.641
	PW-PI	-16.538	27.889	26.333	-13.750	-13.813	29.972	32.336
	PW-MI	-28.869	22.351	25.718	-8.308	-24.346	24.876	17.240
	PI-MI	-12.331	-5.538	-.615	5.442	-10.533	-5.096	-15.096

*Significant at or beyond the .05 level of confidence

TABLE C-3 (continued)

ABERDEEN AREA, 1952

Grade	Race-School	Read. Voc.	Read. Comp.	Arith. Reas.	Arith. Fund.	Lang.	Spell.	Total Score
4	FI-PW	-9.175*	-4.537*	-3.724*	-1.170*	-6.180*	-1.974*	-26.658*
	FI-PI	-4.242*	-1.071	-1.864*	.908	-3.630*	-.936	-10.721*
	FI-MI	-1.676	-.362	-.301	4.503*	-3.720*	-.593	-2.138
	PW-PI	4.933*	3.466*	1.860*	2.078*	2.550*	1.038	15.937*
	PW-MI	7.499*	4.175*	3.423*	5.673*	2.460*	1.381*	24.520*
	PI-MI	2.566	.709	1.563*	3.595*	-.090	.343	8.583*
5	FI-PW	-9.370*	-5.598*	-3.973*	-4.654*	-5.771*	-2.769*	-31.795*
	FI-PI	-1.692	-1.880*	-1.088	-.896	-1.174	-1.174	-7.989*
	FI-MI	1.036	-.980	-.432	1.059	-3.835*	-1.355*	-4.287
	PW-PI	7.678*	3.718*	2.885*	3.758*	4.597*	1.595*	23.806*
	PW-MI	10.406*	4.618*	3.541*	5.713*	1.936*	1.414*	27.508*
	PI-MI	2.728	.900	.656	1.955	-2.661*	-.181	3.702
6	FI-PW	-8.535*	-4.962*	-4.580*	-8.417*	-5.535*	-1.888*	-34.023*
	FI-PI	-.61	-.875	-.365	-1.196	-2.002*	-1.552*	-6.001
	FI-MI	-3.470*	-.727	.067	-1.010	-2.262*	-1.829*	-9.203*
	PW-PI	8.474*	4.087*	4.215*	7.221*	3.533*	.336	28.022*
	PW-MI	5.065*	4.235*	4.647*	7.407*	3.273*	.059	24.820*
	PI-MI	-3.409*	.148	.432	.186	-.260	-.277	-3.202
7	FI-PW	-8.282*	-5.161*	-4.039*	-11.630*	-8.270*	-1.068*	-38.106*
	FI-PI	-4.896*	-1.419	-.595	-3.540*	-4.273*	-2.134*	-17.165*
	FI-MI	-2.874*	-1.897*	-1.415*	-3.344*	-3.295*	-1.731*	-14.381*
	PW-PI	3.386*	3.742*	3.444*	8.090*	3.997*	-1.066	20.941*
	PW-MI	5.408*	3.264*	2.624*	8.286*	4.975*	-.663	23.725*
	PI-MI	2.022	-.478	-.820	.196	.978	.403	2.784
8	FI-PW	-4.849*	-5.353*	-5.795*	-10.745*	-7.448*	-.552	-34.604*
	FI-PI	-3.536*	-2.340*	-1.312	-2.248	-4.629*	-2.041*	-16.215*
	FI-MI	-1.577	-.662	-2.500*	-2.778	-5.017*	-2.123*	-14.619*
	PW-PI	1.313	3.013*	4.483*	8.497*	2.819*	-1.489	18.389*
	PW-MI	3.272*	4.691*	3.295*	7.967*	2.431*	-1.571*	19.985*
	PI-MI	1.959	1.678	-1.188	-.530	-.388	-.082	1.596
9	FI-PW	-9.363*	-7.305*	-10.006*	-11.850*	-8.437*	-1.190*	-47.982*
	FI-PI	-5.181*	-1.754	-4.792*	-.586	-2.994*	-2.310*	-17.449*
	FI-MI	-2.636*	-.294	-4.144*	-.466	-2.888*	.723	-9.537
	PW-PI	4.182*	5.551*	5.214*	11.264*	5.443*	-1.120	30.533*
	PW-MI	6.727*	7.011*	5.862*	11.384*	5.549*	1.913*	38.445*
	PI-MI	2.545	1.460	.648	.120	.106	3.033*	7.912
10	FI-PW	-9.148*	-5.653*	-9.941*	-8.802*	-8.862*	-.903	-43.543*
	FI-PI	-2.060	.088	-2.101	3.740*	-.524	.057	-.709
	FI-MI	-5.959*	-2.184*	-5.216*	-.100	-6.258*	-.885	-20.601*
	PW-PI	7.088*	5.741*	7.840*	12.542*	8.338*	.960	42.834*
	PW-MI	3.189*	3.469*	4.725*	8.702*	2.604	.018	22.942*
	PI-MI	-3.899*	-2.272*	-3.115*	-3.840	-5.734*	-.942	-19.892*
11	FI-PW	-12.715	-4.788*	-8.264*	-8.469*	-10.295*	-2.070*	-46.501*
	FI-PI	-2.045	-.187	.495	3.547	-1.579	-1.796*	-1.602
	FI-MI	-6.303*	-3.125*	-2.673*	-.329	-7.136*	.378	-19.404*
	PW-PI	10.670*	4.601*	8.759*	12.016*	8.716*	.274	44.899*
	PW-MI	6.412*	1.663	5.591*	8.140*	3.159*	2.448*	27.097*
	PI-MI	-4.258*	-2.938*	-3.168*	-3.876	-5.557*	2.174*	-17.802*
12	FI-PW	-8.437*	-3.583*	-7.131*	-8.402*	-6.542*	-.711	-34.618*
	FI-PI	-4.051	-0.060	-1.850	1.155	-3.888*	-.533	-9.130
	FI-MI	-8.211*	-3.092*	-4.739*	-4.647	-9.932*	-1.888*	-31.641*
	PW-PI	4.386*	3.523*	5.281*	9.557*	2.654*	.178	25.488*
	PW-MI	.226	.491	2.392	3.755	-3.390	-1.177	2.977
	PI-MI	-4.160	3.032*	-2.889	-5.802	-6.044*	-1.355	-22.511

*Significant at or beyond the .05 level of confidence

TABLE C-3 (continued)
BILLINGS AREA, 1953

Grade	Race-School	Read. Voc.	Read. Comp.	Arith. Reas.	Arith. Fund.	Lang.	Spell.	Total Score
4	FI-PW	-8.858*	-4.010*	-1.763	1.119	-3.413*	-2.289*	-19.031*
	FI-PI	-2.350	-.291	.902	2.840*	-.333	-1.017	-.065
	FI-MI	3.122	1.477	2.297	1.989	3.025*	-.735	11.358
	PW-PI	6.508*	3.719*	2.665*	1.721*	3.080*	1.272*	18.966
	PW-MI	11.980*	5.487*	4.060*	.870	6.438*	1.554	30.389*
	PI-MI	5.472	1.768*	1.395	-.851	3.358*	.282	11.423
5	FI-PW	-8.260*	-5.309*	-3.164*	-2.647	-4.498	-1.910	-26.060*
	FI-PI	-5.573*	-2.173	.332	-.165	-1.613*	-.951*	-11.278*
	FI-MI	2.078	.490	2.284	2.477*	2.647*	1.373	11.053
	PW-PI	2.687*	3.136*	2.832*	2.482*	2.885*	.959*	14.782*
	PW-MI	10.338*	5.799*	5.448*	5.124*	7.145*	3.283*	37.113*
	PI-MI	7.651	2.663*	2.616*	2.642*	4.260*	2.324*	22.331*
6	FI-PW	-12.403*	-7.288*	-6.464*	-8.143	-6.638*	-4.983*	-45.919*
	FI-PI	-8.167*	-3.099*	-3.046*	-3.801*	-2.699*	-3.065*	-23.876*
	FI-MI	-5.344	.194	1.249	3.924	.321	-2.744*	-5.700
	PW-PI	4.236*	4.189	3.418*	4.342*	3.939*	1.918*	22.043*
	PW-MI	7.059*	7.482*	7.713*	12.067*	6.959*	2.239*	40.219*
	PI-MI	2.823	3.293*	4.295*	7.725*	3.020*	.321	18.176*
7	FI-PW	-13.662	-8.586	-9.966	-23.033	-11.468	-3.369	-70.084
	FI-PI	-6.004	-3.183	-4.344	-13.233	-4.600	-1.965	-33.472
	FI-MI	2.314	-.136	.943	-5.753	.399	.636	-2.869
	PW-PI	7.658*	5.403	5.622*	9.800*	6.868*	1.404*	36.612*
	PW-MI	15.976*	8.450*	10.909*	17.280*	11.867*	2.733*	67.215*
	PI-MI	8.318*	3.047*	5.287*	7.480*	4.999*	1.329	30.603*
8	FI-PW	-14.383	-8.241	-12.126	-23.631	-14.105	-4.151	-76.638
	FI-PI	-8.481	-2.522	-5.193	-13.398	-9.085	-3.478	-42.157
	FI-MI	.833	1.085	2.713	-4.805	-.107	.448	-.102
	PW-PI	5.902*	5.719*	6.933*	10.233*	5.020*	.673	34.481*
	PW-MI	15.216*	9.326	14.839*	18.826*	13.998*	4.599*	76.536*
	PI-MI	9.314*	3.607*	7.906*	8.593*	8.978*	3.926*	42.055*
9	FI-PW	-19.188	9.402	-16.599	-27.099	-19.273	-6.620	-98.695
	FI-PI	-11.823	-3.411	-7.136	-13.465	-12.344	-5.278	-53.457
	FI-MI	-11.030	2.273	-4.394	-7.697	-7.091	-6.182	-38.667
	PW-PI	7.365*	5.991*	9.463*	13.634*	6.929*	1.342	45.238*
	PW-MI	8.158*	7.129*	12.205*	19.402*	12.182*	.438	60.028*
	PI-MI	.793	1.138	2.742	5.768	5.253*	-.904	14.790
10	FI-PW	-5.208	-4.756	-11.673	-16.125	-10.506	1.655	-46.542
	FI-PI	-.167	-2.667	-6.913	-13.267	-7.403	.665	-29.752
	FI-MI	8.975	3.425	2.975	1.875	.175	2.150	19.575
	PW-PI	5.041*	2.089	4.760*	2.858	3.103	-.990	16.790
	PW-MI	14.183	8.181	14.648	18.000	10.681	.495	66.117
	PI-MI	9.142	6.092	9.888	15.142	7.578	1.485	49.327
11	FI-PW							
	FI-PI							
	FI-MI							
	PW-PI	7.532*	3.011*	7.957*	5.925*	7.461*	1.463	33.350*
	PW-MI	12.603	5.678	16.086	21.704	11.773	-.075	67.769
	PI-MI	5.071	2.667	8.129	15.779	4.312	1.538	34.419
12	FI-PW							
	FI-PI							
	FI-MI							
	PW-PI	7.557*	2.908	5.634	5.423	5.437*	3.883	28.576*
	PW-MI	8.509	4.323	12.990	13.915	8.563	1.747	47.779
	PI-MI	.952	1.415	7.356	8.492	3.126	-2.136	19.203

*Significant at or beyond the .05 level of confidence

TABLE C-3 (continued)

ANADARKO AREA, 1954

Grade	Race-School	Read. Voc.	Read. Comp.	Arith. Reas.	Arith. Fund.	Lang.	Spell.	Total Score
4	FI-PW	-14.928*	-3.964*	-3.427*	.907	-5.753*	-1.182	-28.388*
	FI-PI	-13.897*	-4.493*	-3.101*	1.902	-4.796*	-2.651	-27.037*
	PW-PI	1.031	-5.29	.326	.995	.957	-1.469	1.351
5	FI-PW	-9.901*	-4.152*	-3.192*	.211	-1.603	.776	-17.699*
	FI-PI	-6.780*	-.644	.775	1.635	1.054	1.305	-4.298
	PW-PI	3.121	3.508*	2.417*	1.424	2.657*	.529	13.401*
6	FI-PW	-7.459*	-3.304*	-4.383*	-4.920*	-2.443	-.082	-22.592*
	FI-PI	-3.716	-1.238	-1.894	.444	-.965	-.582	-7.785
	PW-PI	3.743	2.066	2.489	5.364*	1.478	-.500	14.807
7	FI-PW	-10.366*	-5.132*	-5.467*	-6.660*	-8.353*	-.817	-36.701*
	FI-PI	-4.179	-.627	-2.728*	-.644	-5.894*	-1.383	-15.961*
	PW-PI	6.187*	4.505*	2.739*	6.016*	2.459	-.566	20.740*
8	FI-PW	-7.369*	-2.826*	-4.646*	-9.120*	-4.737*	.148	-28.687*
	FI-PI	-3.503	.404	-.640	-.217	-1.712	-1.142	-6.827
	PW-PI	3.866	3.230*	4.006*	8.903*	3.025*	-1.290	21.860*
9	FI-PW	-5.853*	-3.590*	-6.448*	-8.358*	-5.652*	-.176	-29.862*
	FI-PI	-6.178*	-1.992*	-4.709*	-3.989	-3.493*	-2.609	-22.753*
	PW-PI	-.325	1.598	1.739	4.369	2.159	-2.433	7.109
10	FI-PW	-7.030*	-3.761*	-8.707*	-10.792*	-7.581*	-.139	-38.047*
	FI-PI	-3.409	-1.617	-5.870*	-6.673*	-4.825	-.988	-23.355*
	PW-PI	3.621	2.144	2.837	4.119	2.756*	-.849	14.692
11	FI-PW	-2.943*	-1.151	-5.701*	-8.983*	-6.047*	-.470	-25.253*
	FI-PI	-.709	1.033	-2.828	-2.199	-6.056*	-.580	-11.298
	PW-PI	2.234	2.184	2.873	6.784	-.009	-.110	13.955
12	FI-PW	-6.201*	-1.660	-7.804*	-7.130*	-5.600*	.529	-27.987*
	FI-PI	-2.234	-3.039	-3.601	-4.752	-5.884*	.798	-18.887*
	PW-PI	3.967	-1.379	4.203	2.378	-.284	.269	9.100

*Significant at or beyond the .05 level of confidence

TABLE C-3 (continued)

MUSKOGEE AREA, 1954

Grade	Race-School	Read. Voc.	Read. Comp.	Arith. Reas.	Arith. Fund.	Lang.	Spell.	Total Score
4	FI-PW	4.473*	.049	-1.257	.518	.990	.370	5.053
	FI-PI	9.970*	-.373	-.422	2.287	.942	-.411	11.796
	PW-PI	5.497*	-.422	.835	1.769	-.048	-.781	6.743
5	FI-PW	-5.860*	-3.66*	-2.945*	-1.351	-3.782*	-.611	-17.900*
	FI-PI	-1.482	-1.729	-1.618	-.263	-2.369*	-1.888*	-9.009
	PW-PI	4,378	1.937*	1.327	1.088	1.413	-1.277	8.891
6	FI-PW	-7.879*	-3.119	-3.687*	-6.370*	-2.138*	.120	-23.046*
	FI-PI	-2.328	-2.059	-1.982*	-3.002*	-2.176*	-.428	-12.090*
	PW-PI	5.551*	1.060	1.705*	3.368*	-.038	-.548	10.956
7	FI-PW	-6.146*	-1.672	-4.262*	-7.805*	-5.564*	-.758	-25.536*
	FI-PI	-6.112*	-2.063	-3.729*	-4.721*	-4.048*	-1.906	-21.836*
	PW-PI	.034	-.391	.533	3.084	1.516	-1.148	3.700
8	FI-PW	-5.827*	-2.980*	-4.235*	-3.145*	-5.592	.394	-21.914*
	FI-PI	-5.399*	-1.065	-2.463*	1.056*	-3.111	.843	-11.037
	PW-PI	.428	1.915	1.772	4.201	2.481	.449	10.877
9	FI-PW	-3.486*	-2.497*	-5.081	-3.253	-4.354*	1.007	-17.529*
	FI-PI	1.986	2.378*	-1.000	.567	-.095	1.362	5.045
	PW-PI	5.472*	4.875*	4.081	3.820*	4.259*	.355	22.574*
10	FI-PW	-4.578*	-.823	-7.319*	-7.011*	-.903	1.718*	-18.916*
	FI-PI	-4.898*	.613	-6.871*	-6.163*	-1.774	-.530	-20.849*
	PW-PI	-.320	.210	.448	.848	-.871	-2.248*	-1.933
11	FI-PW	-7.985*	-3.715*	-11.849*	-10.960*	-.243	-.409	-35.160*
	FI-PI	-4.253	-1.486	-10.067*	-6.347	.590	-.329	-20.690
	PW-PI	3.732	2.229	1.782	4.613	.833	.080	14.470
12	FI-PW	-8.755*	-1.609	-4.820*	-2.863	5.266*	2.555	-10.226
	FI-PI	-6.391	-.351	-2.212	1.768	3.738	.565	-2.883
	PW-PI	2.364	1.258	2.608	4.631	-1.528	-1.990	7.343

*Significant at or beyond the .05 level of confidence

APPENDIX D

Levels of Achievement

Differential Diagnosis on Achievement Profiles

Table D-1 5% and 1% Levels of Significance of Differences in T-Scores-Elementary Level

Table D-2 5% and 1% Levels of Significance of Differences in T-Scores-Intermediate Level

Table D-3 5% and 1% Levels of Significance of Differences in T-Scores-Advanced Level

Table D-4 Phoenix Area Norm Tables (Fall) California Achievement Tests

LEVELS OF ACHIEVEMENT

A reference was made in Chapter VII as to how a distribution of raw scores for one grade in an area may be stratified for an interpretation of meaningful levels of achievement. These levels are determined by the three raw score points in a grade distribution nearest to the mean and plus and minus one standard deviation from the mean. The standard deviation may be described as the average distance of all scores from the mean of a distribution of scores. Thus the raw scores within the range of plus and minus one standard from the mean may be considered average scores. They will include about 68% of the cases. The 34% of the scores between the mean and +1 S. D. may be called high average, while the 34% between the mean and -1 S. D. may be called low average. The achievement of the 16% of individuals scoring above +1 S. D. may be called high, while the achievement of the 16% scoring below -1 S. D. may be characterized as low.

Table D-1 presents the raw score limits for each level of achievement on each of the seven tests for each grade in the Anadarko area (and combined with the Muskogee area on the advanced level). Similar tables have been prepared for each of the other areas.

DIFFERENTIAL DIAGNOSIS ON ACHIEVEMENT PROFILES

When a battery of tests is administered to a group of individuals, three major problems of the interpretation of scores arise: the comparability of scores of one test with those of another; the significance of the difference of scores on the same test; and the significance of the difference of scores on different tests.

The problem of comparability asks the question: What scores on all the other tests are equivalent to a score of x on test X? In this study comparability was obtained on each level of the California Achievement Test by normalizing the distributions of scores, plotting each on the same scale of T-scores, and using the distributions of the same group in an area to obtain normalized standard scores for all seven tests.

The problem of the significance of difference of scores on the same test poses the question: Taking chance variation into account, when can we say that two scores are most probably different scores; i.e., one is really higher or lower than another? The standard error of measurement was calculated for each test on a level,* prior to which reliability coefficients were obtained. Raw scores were plotted on the profile approximately one standard error apart. A difference in raw scores exceeding two standard errors may be expected less than five times in a hundred by chance alone.

The third problem, of the significance of difference of scores on different tests, asks the question: When can we say that the achievement on one test is really higher than on another? In Chapter VII reference was made to a "rule-of-thumb" that a difference as great as or greater than 8 T-scores between two different tests could be considered significant. A short explanation as to the method of obtaining this amount is in order.

A t-test can be made to test the probability level of every possible difference between each of the tests by using the formula:

$$t = \frac{\text{Difference between standard scores}}{\text{standard error of the difference}} = \frac{z_1 - z_2}{\sqrt{2 - r_{1\,I} - r_{2\,II}}}$$

where z = a z score; i.e., a raw score divided by the standard deviation
r = a reliability coefficient

A simpler way is to establish the t value for the desired level of confidence (.05 or .01) and to solve for the z score difference on each pair of tests, using their respective reliability coefficients. These differences were calculated for the five per cent and one per cent levels of confidence for each pair of tests on each level in each area. The average T-score difference (ten times the z score difference) at the five per cent level in all areas was found to be about 8. Thus the "rule-of-thumb" was found to be fairly consistent through all the areas.

The calculated values of difference in T-scores in the Anadarko area for both the five per cent and one per cent levels are shown in the accompanying tables. On the advanced level the Anadarko and Muskogee areas were combined, it will be recalled.

The tables may be interpreted as in the following illustration. In Table D-1, we see that a difference of nine T-scores or more between reading vocabulary and spelling may be expected less than five times in a hundred by chance alone. A difference of twelve T-scores or more on these two tests may be expected less than one time in a hundred by chance alone. These differences are considered significant on their respective levels of confidence. For speed in interpreting profiles the "rule-of-thumb" may be considered adequate.

TABLE D-1

5% and 1% Levels of Significance of Differences in T-Scores

Anadarko: Elementary Level N = 154

	Read. Comp.	Arith. Reas.	Arith. Fund.	Lang.	Spell.	Total Score
Read. Vocab.	8.04	8.35	6.714	9.16	8.69	5.53
	10.60	11.01	8.85	12.07	11.46	7.29
Read. Comp.		9.41	7.99	10.13	9.71	6.03
		12.40	10.54	13.36	12.80	9.26
Arith. Reas.			8.30	10.38	9.97	7.38
			10.95	13.69	13.15	9.73
Arith. Fund.				9.12	8.65	5.46
				12.02	11.40	7.20
Language					10.66	8.29
					14.05	10.92
Spelling						7.77
						10.24

	.05	.01
Average	8.37	11.09

TABLE D-2

5% and 1% Levels of Significance of Differences in T-Scores

Anadarko: Intermediate Level N = 192

	Read. Comp.	Arith. Reas.	Arith. Fund.	Lang.	Spell.	Total Score
Read. Vocab.	8.73	7.59	7.18	8.45	9.28	6.40
	11.52	10.02	9.47	11.15	12.24	8.45
Read. Comp.		8.15	7.70	8.90	9.68	6.98
		10.67	10.16	11.74	12.78	9.21
Arith. Reas.			6.38	7.78	8.67	5.49
			8.42	10.27	11.45	7.24
Arith. Fund.				7.38	8.31	4.90
				9.74	10.97	6.46
Language					9.43	6.62
					12.45	8.74
Spelling						7.65
						10.09

	.05	.01
Average	7.70	10.15

TABLE D-3

5% and 1% Levels of Significance of Differences in T-Scores

Muskogee and Anadarko: Advanced Level N = 217

	Read. Comp.	Arith. Reas.	Arith. Fund.	Lang.	Spell.	Total Score
Read. Vocab.	10.51	9.00	7.95	9.42	11.44	7.36
	13.87	11.87	10.49	12.44	15.10	9.71
Read. Comp.		10.14	9.23	10.53	12.37	8.73
		13.39	12.18	13.90	16.32	11.52
Arith. Reas.			7.47	9.02	11.11	6.83
			9.85	11.90	14.66	9.01
Arith. Fund.				7.98	10.28	5.38
				10.53	13.57	7.10
Language					11.46	7.39
					15.12	9.75
Spelling						9.83
						12.97
				.05	.01	
			Average	9.21	12.15	

Table D-4

PHOENIX AREA NORM TABLES (FALL)
CALIFORNIA ACHIEVEMENT TESTS

	Read. Vocab.	Read. Comp.	Arith. Reas.	Arith. Fund.	Language	Spelling	Total
GRADE 4 ELEMENTARY LEVEL - N=550							
Low	0-32	0- 8	0- 8	0-11	0-15	0- 3	0- 88
Low Average	33-48	9-13	9-14	12-18	16-22	4- 7	89-119
High Average	49-62	14-19	15-19	19-24	23-29	8-13	120-156
Superior	63-90	20-40	20-45	25-80	30-45	14-30	157-330
GRADE 5 ELEMENTARY LEVEL - N=527							
Low	0-41	0-12	0-13	0-18	0-19	0- 6	0-118
Low Average	42-58	13-18	14-20	19-25	20-25	7-12	119-155
High Average	59-70	19-24	21-26	26-31	26-32	13-18	156-194
Superior	71-90	25-40	27-45	32-80	33-45	19-30	195-330
GRADE 6 ELEMENTARY LEVEL - N=504							
Low	0-52	0-15	0-16	0-21	0-22	0- 7	0-144
Low Average	53-63	16-21	17-24	22-30	23-29	8-15	145-182
High Average	64-75	22-28	25-30	31-37	30-35	16-20	183-222
Superior	76-90	29-40	31-45	38-80	36-45	21-30	223-330
GRADE 7 INTERMEDIATE LEVEL - N=420							
Low	0-28	0-16	0-12	0-16	0-23	0- 4	0-112
Low Average	29-40	17-23	13-18	17-28	24-31	5-11	113-153
High Average	41-50	24-29	19-24	29-43	32-39	12-18	154-197
Superior	51-80	30-51	25-51	44-77	40-57	19-28	198-324
GRADE 8 INTERMEDIATE LEVEL - N=416							
Low	0-25	0-17	0-14	0-26	0-26	0- 7	0-128
Low Average	26-44	18-26	15-23	27-41	27-36	8-11	129-182
High Average	45-57	27-33	24-32	42-55	37-45	12-20	183-229
Superior	58-80	34-51	33-51	56-77	46-57	21-28	230-324
GRADE 9 INTERMEDIATE LEVEL - N=262							
Low	0-41	0-24	0-20	0-32	0-33	0-11	0-175
Low Average	42-53	25-32	21-29	33-51	34-42	12-18	176-228
High Average	54-65	33-40	30-40	52-64	43-50	19-26	229-273
Superior	66-80	41-51	41-51	65-77	51-57	27-28	274-324
GRADE 10 ADVANCED LEVEL - N=219							
Low	0-20	0-21	0-18	0-34	0-39	0- 6	0-152
Low Average	21-30	22-29	19-27	35-50	40-47	7-11	153-196
High Average	31-42	30-36	28-38	51-64	48-57	12-16	197-250
Superior	43-69	37-53	39-58	65-79	58-76	17-26	251-350
GRADE 11 ADVANCED LEVEL - N=160							
Low	0-22	0-23	0-19	0-33	0-41	0- 6	0-155
Low Average	23-33	24-31	20-28	34-49	42-49	7-12	156-199
High Average	34-48	32-39	29-41	50-66	50-60	13-19	200-265
Superior	49-69	40-53	42-58	67-79	61-76	20-26	266-350
GRADE 12 ADVANCED LEVEL - N=87							
Low	0-26	0-27	0-20	0-37	0-44	0- 9	0-180
Low Average	27-36	28-34	21-29	38-57	45-53	10-14	181-213
High Average	37-53	35-40	30-43	58-69	54-62	15-20	214-284
Superior	54-69	41-53	44-58	70-79	63-76	21-26	285-350

APPENDIX E

Letter of February 9, 1951, from E. Gordon Collister to Willard W. Beatty, Proposing the Content of the Predictive Test Battery

Letter of February 12, 1951, from L. Madison Coombs to the Area Directors, Advising Them of Preliminary Planning for Predictive Testing

Letter of February 27, 1951, from L. Madison Coombs to the Area Directors, Advising Them of Specific Procedures for Predictive Testing

Application Form for the Predictive Test Battery

Table E-1 Intercorrelations of Scores on the Test Battery for Haskell Commercial Applicants, 1951-54

Table E-2 Test Battery for Haskell Commercial-Standard Errors of Measurement and Reliability Coefficients

Table E-3 Expectancy Tables for Pass and Fail Groups-Haskell Commercial Program, 1951-54

February 9, 1951

Dr. Willard W. Beatty
Director of Indian Education
Bureau of Indian Affairs
New Interior Building
Washington 25, D. C.

Dear Dr. Beatty:

After several discussions with Mr. Coombs and Mr. Kelley, the following battery is suggested for use with Indian students applying for educational loans or admission to Haskell.

Test	Time
Otis Quick-Scoring Mental Ability Test (Gamma)	30 min.
Cooperative General Achievement Test - Proficiency in Mathematics	40 min.
Cooperative English Test (single booklet edition - lower level)	
C_1 - Reading Comprehension	40 min.
A - Mechanics of Expression	40 min.
B_1 - Effectiveness of Expression	40 min.
Guilford-Zimmerman Temperment Survey	untimed (Approximately 60 min.)

For students requesting admission to the commercial sequence at Haskell, we suggest substituting the Hundred-Problem Arithmetic Test (Schorling-Clark-Potter) for the Cooperative Mathematics Test. Provided replacement costs for test materials do not soar, the estimated cost for this battery is $.75 per individual. This includes the cost of the test materials, answer sheets, profiles, scoring, use of electrographic pencils, and postage for mailing tests and test reports. It is our understanding that the individual applicant will pay a fee of $.50 and for the remainder of this fiscal year the balance of the cost will be drawn from our contract funds.

With the exception of the Hundred-Problem Arithmetic Test none of the above tests involve a very short time limit for a subtest. This reduces the importance of small timing errors.

The Otis test is suggested since we already have information from previous testing programs that may lead to meaningful comparisons. Since the content of the Cooperative Mathematics test is not particularly suited to the areas important in the Haskell commercial department, we suggest the use of a test dealing specifically with fundamental arithmetical operations for applicants to this program.

In our discussions there was a difference of opinion regarding the Cooperative English Test. There was agreement on the use of part C_1 - Reading Comprehension. The use of both A - Mechanics of Expression and B_1 - Effectiveness of Expression was questioned. The content of subtest A deals with material usually associated with drill work in many English courses. To this extent the content will probably be familiar to students. The content of subtest B_1 is not as susceptible to practice and apparently is closely associated with the usual "Freshman Composition." To have a complete picture of the English background of an individual student it is felt that the three subtests are important.

There was considerable discussion regarding the use of the Guilford-Zimmerman Temperment Survey. It was suggested that decisions concerning the granting of an educational loan would not be based on the results of this instrument. In addition, the findings reported in the Educational Records Bureau study indicated that personality ratings did not add to the prediction of college success. It should be noted that the latter conclusion is based on the use of personality ratings. We cannot make the same statement concerning the use of scores on a personality inventory although it is not expected that any correlation with college success would be particularly high. The most important use of personality data appears to be for research purposes. If, at some later date, a follow-up study of applicants is contemplated, the time to obtain personality estimates is at the same time other test data are collected. For this reason the use of the Guilford-Zimmerman is suggested.

There are several general considerations which are important.

1. The tests suggested are not "easy." The battery may be criticized as being too difficult for the background of some of the Indian students. However, the people taking this battery will be a highly select group from the total group of Indian students. Since the question at issue is not one of general level of achievement but one of ability and preparation for advanced study, test instruments suitable for this purpose should be used.

2. The impact of a battery of this type on the individual student is of considerable importance. Mr. Coombs has already raised this question and is considering means of ameliorating the problem.

3. It may appear that the length of the battery is excessive. Considering the importance of the questions to be answered, it is not felt that this objection is valid.

4. Tests in the areas of natural science and social studies have not been included in the battery. Perhaps they should be considered for use at some future time when the fields of specialization for college students are known.

In case you do not have copies of the suggested test, Mr. Kelley has a set with him for your use. We will await a reply from you before proceeding with further arrangements. Tests will be ready for distribution two weeks from the receipt of your reply.

Yours truly,

E. Gordon Collister
Director

February 12, 1951

Mr. Allan C. Harper, Area Director
Office of Indian Affairs
Window Rock Area Office
Window Rock, Arizona

Attn: Hildegard Thompson
Director of Navajo Schools

Dear Mr. Harper:

This letter is for the purpose of bringing you up to date on future plans of the Service-Wide Testing Program with the thought that you will wish to pass this information on to reservation and school principals in your area at the earliest opportunity.

During the period December 11 to 14 inclusive, a conference was held at Haskell Institute for the purpose of reviewing the Indian Education Evaluation Program and charting its course for the future. The meeting was attended by the following representatives of the Indian Service: Mr. Willard W. Beatty, Chief of the Education Branch; Dr. George Dale, Education Specialist, Research; Mr. Earl Intolubbe, Education Specialist, Supervisor of Guidance; and Madison Coombs, Education Specialist and Director of the Service-Wide Testing Program. Dr. Kenneth E. Anderson, Director of the Bureau of Research and Service; Mr. Gordon Collister, Director of the Guidance Bureau; and Mr. Carl Ladd, graduate assistant, represented the University of Kansas.

The following decisions of immediate importance to you and your personnel were made: (1) There will be no achievement testing for survey purposes on a nation-wide basis this year. Since the University of Kansas has recently assumed the responsibility of serving as consultant to the program, it was felt that the University men should have an opportunity to make a thorough study of what has been done in the past, to survey the instruments which have been used, and to have a hand in planning any future cycle of testing. Testing on a service-wide basis will be resumed during the 1951-52 school year. (2) The administration of tests to 12th graders who wish to be considered for educational loans or who make application for admission to the Haskell Commercial Department will be continued this spring, if present plans materialize. The selection of tests to be used for this guidance function is in process. It is not presumed that all 12th graders will be tested, but only those, both in our Indian Service schools and mission and public schools, for whom we need predictive data relative to their pursuing an education at the post high school level. Detailed information concerning the procedure to be followed will be sent out from this office soon. (3) A statistical analysis of the result of last spring's achievement testing and interpretation of the data will be completed by the University of Kansas as soon as possible. (4) An effort will be made to validate instruments used in the past for the purpose of predicting success in college by making comparative studies between scores on the tests and the student's success at the college level. These tests would include the Gates Basic Reading, Pressey English, and the Factorial Abilities Series, among others.

Inasmuch as we had tentatively planned at one time to do survey testing early in the current semester, I felt that the above information should be passed on to you so that you and your school personnel would know that time would not need to be allotted for this purpose this year.

Sincerely yours,

L. Madison Coombs
Education Specialist
Indian Service Testing Program

Approved:

Solon G. Ayers
Superintendent

February 27, 1951

Mr. William Wade Head, Area Director
Office of Indian Affairs
Federal Building
Anadarko, Oklahoma

Attn: Mr. Henry Wall
Area Supervisor of Education

Dear Mr. Head:

As promised in our letter of February 12, paragraph 3, item 2, this letter will acquaint you with plans and procedures for the testing this spring of 12th grade students who wish to be considered for educational loans or for admission to the Haskell Institute commercial training course. Inasmuch as the new plan represents a considerable departure from procedures used in recent years, the plan will be described in some detail below.

1. The test battery has been adopted upon the recommendation of the Guidance Bureau of the University of Kansas and has been approved by Mr. Willard W. Beatty, Chief of Education Branch, and Mr. Earl C. Intolubbe, Education Specialist, Guidance. The battery will consist of the following tests:

Test	Time Limit
Otis Quick Scoring Test of Mental Ability (Gamma)	30 minutes
Cooperative English Test (single booklet edition lower level)	
C_1 Reading Comprehension	40 minutes
A Mechanics of Expression	40 minutes
B_1 Effectiveness of Expression	40 minutes
Guilford-Zimmerman Temperament Survey - untimed	Approx. 60 min.
Cooperative General Achievement Test - Proficiency in Mathematics (for educational loan applicants)	40 minutes
Hundred-Problem Arithmetic Test (Schorling-Clark-Potter) (for Haskell commercial applicants)	40 minutes

These tests cover most of the basic skills which are important to academic success and therefore should have validity in predicting academic success or failure at the post high school level. We anticipate a universal reaction that the tests are relatively difficult. While this is true, we wish to point out that the purpose of the tests is to aid in predicting success or failure in college, nurse's training, or the commercial course, and not to measure achievement in high school. They should prove more discriminating as between individual students than "easier" tests would be. It cannot be emphasized too strongly that no student will be expected to answer all of the items correctly. An important advantage of most of the tests selected is that percentile norms for entering college freshmen are available for them. It is suggested that you exercise considerable discretion about revealing, in advance of testing, the names of the tests which comprise the battery.

2. The batteries will be available for distribution about March 15 by the Guidance Bureau of the University of Kansas. You are being supplied, under separate cover, with forms on which the applicant will place his order with the Guidance Bureau. The applicant is required to include a fee of 50¢ with his order to partly defray the cost of the battery and the processing thereof. Also we are requiring that the applicant's high school or reservation principal or area educationist approve the order so that we may be assured that the battery is being mailed to a proper person for administration. It is felt that the 50¢ fee will not preclude any person's taking the tests or work a hardship but will serve to emphasize the importance of the tests and cause the applicant to feel that he has made a small investment in his future.

3. The battery, together with explicit instructions for administering, will be mailed to the person who is to give the test. Some of the tests will have answer sheets and special pencils for machine scoring. All of the tests and answer sheets will be returned to the Guidance Bureau for scoring. It is recommended that whenever possible the battery be administered during parts of three different days, over the span of a week, to lessen the impact of the battery. In cases where this is not feasible or where a hardship would be occasioned thereby, the tests may all be given in one day but a full day should be set aside for the purpose with provision for adequate rest periods.

4. It is recognized that the persons to whom this is addressed have a difficult problem to solve in setting up an organization for the administration of these tests. Principals of our own Indian Service high schools will undoubtedly want to test all of the applicants from their school at one time. Consequently they will probably prefer to send all of their application forms and fees to the Guidance Bureau together. Testing of mission and public school applicants will probably present more of a problem. You may wish to designate boarding schools in your area as testing centers. The main concern of this office is that the persons giving the tests prepare themselves carefully by studying the directions and that they adhere to them closely.

5. One copy of the test results for educational loan applicants will be sent to Mr. Intolubbe, Supervisor of Guidance, and one to the educationist of the area in which the applicant took the test. Copies of test results for commercial course applicants will be sent to Mr. Intolubbe, Haskell Institute, and the area educationist.

If you have questions which are not answered in this letter do not hesitate to write us at any time. We wish to be of help in any way possible.

Sincerely yours,

L. Madison Coombs
Education Specialist
Indian Service Testing Program

Approved:

Solon G. Ayers
Superintendent

DIRECTIONS TO APPLICANT: Please fill in this form and mail it to the Guidanc Bureau at the University of Kansas as addressed below. The test battery, of course, cannot be sent directly to you, but must be sent to the person taking the responsibility for the administration of the tests. Consult your high school or reservation principal or the director of schools in your Indian Service Area Office for help in completing this form and secure his signature on the appropriate line below. PLEASE PRINT OR USE TYPEWRITER.

The Guidance Bureau
University of Kansas
Lawrence, Kansas

Gentlemen:

I am an applicant for:

(Check the appropriate square.)

☐ College study (educational loan, scholarship)

☐ Commercial training

Please mail my battery of tests to:

(Name of person administering tests)	(Title)
(Street Number or P.O. Box)	
(City or town)	(State)
(Name of applicant's high school)	(Address of applicant's high school)

Approved:

(Signature of high school or reservation principal, or area director of schools)

(Applicant's agency)

Yours truly,

(Applicant's signature)

(Applicant's address)

TABLE E-1

INTERCORRELATIONS OF SCORES ON THE TEST BATTERY FOR HASKELL COMMERCIAL APPLICANTS, 1951-54

		Mech. Exp.	Eff. Exp.	Vocab.	Speed	H. P. A.	Otis I.Q.	G	Guilford-Zimmerman Temperament Survey R	A	S	E	O	F	T	P	M
N = 283	Reading Comp. I	55	69	71	88	46	64	19	24	06	18	19	25	24	25	30	12
N = 84	Reading Comp. II	49	71	71	86	35	66	-07	26	13	-09	13	27	12	21	31	13
N = 41	Reading Comp. III	38	50	70	92	21	59	19	04	-10	-06	04	-05	-04	13	21	01
N = 408	Mech. of Exp.		66	57	52	48	58	16	12	02	12	12	16	14	13	17	05
	Eff. of Exp.			72	69	48	72	14	15	00	08	12	18	14	16	27	08
	Reading Vocab.				76	38	70	16	23	06	08	13	20	13	25	25	14
	Reading Speed					45	71	16	17	07	11	19	28	16	18	28	15
	H. P. Arithmetic						49	14	11	05	08	05	14	10	15	15	15
	Otis I. Q.							21	17	03	14	14	20	14	16	28	10
	G								14	32	42	33	23	06	31	20	18
	R									23	21	39	36	45	36	32	22
	A										62	32	28	10	30	21	26
	S											44	40	29	20	35	15
	E												65	46	03	36	35
	O													62	01	57	38
	F														00	50	28
	T															22	02
	P																23

All Correlations are Pearson Product-Moment Coefficients Based Upon the Scores of 408 Female Applicants to the Haskell Commercial Department. Decimals have been omitted.

D.F.	Significance Levels $r_{.05}$	r_{01}
39	.31	.40
82	.21	.28
281	.12	.15
406	.10	.13

TABLE E-2

TEST BATTERY FOR HASKELL COMMERCIAL
STANDARD ERRORS OF MEASUREMENT AND RELIABILITY COEFFICIENTS

		FEMALE APPLICANTS N = 100		MALE APPLICANTS N = 100*	
		S.E.	r	S.E.	r
Mechs. of Exp.		3.30	.887	3.92	.831
Eff. of Exp.		3.52	.777	5.18	.529
Vocabulary		2.85	.762	3.15	.807
Speed		2.29	.791	2.41	.648
Comprehension I		3.17	.80[illegible]	3.61	.776
Otis		3.31	.735	3.82	.646
H. P. Arithmetic		3.95	.809	3.72	.841
GZTS Scales:	G	2.14	.813	2.49	.681
	R	2.56	.633	2.44	.627
	A	2.59	.643	2.44	.747
	S	2.15	.666	2.69	.757
	E	3.19	.626	2.61	.779
	O	2.64	.607	2.34	.827
	F	3.07	.455	2.94	.725
	T	2.35	.705	2.38	.763
	P	2.55	.717	2.46	.737
	M	2.23	.731	2.30	.712

*For Males on Hundred Problem Arithmetic, N = 97

TABLE E-3

EXPECTANCY TABLES FOR PASS* AND FAIL GROUPS
HASKELL COMMERCIAL PROGRAM, 1951-1954

Test	Group	Score Interval	% Pass	% Fail	N Pass	N Fail
Mechanics of Expression	I	147 -- ___	100	0	22	0
	II	120 -- 146	92	8	100	9
	III	95 -- 119	78	22	64	18
	IV	71 -- 94	64	36	21	12
	V	___ -- 70	65	35	11	6
					218	45
Effectiveness of Expression	I	51 -- ___	100	0	33	0
	II	37 -- 50	95	5	91	5
	III	25 -- 36	75	25	54	18
	IV	14 -- 24	68	32	30	14
	V	___ -- 13	50	50	7	7
					215	44
Reading Vocabulary	I	43 -- ___	95	5	18	1
	II	27 -- 42	96	4	96	4
	III	14 -- 26	79	21	85	22
	IV	5 -- 13	52	48	14	13
	V	___ -- 4	50	50	5	5
					218	45
Reading Speed	I	40 -- ___	100	0	27	0
	II	25 -- 39	96	4	89	4
	III	14 -- 24	85	15	78	14
	IV	5 -- 13	51	49	22	21
	V	___ -- 4	25	75	2	6
					218	45
Reading Comprehension I	I	19 -- ___	96	4	24	1
	II	14 -- 18	91	9	51	5
	III	9 -- 13	83	17	43	9
	IV	3 -- 8	58	42	19	14
	V	___ -- 2	33	67	1	2
					138	31
Arithmetic	I	82 -- ___	98	2	44	1
	II	62 -- 81	91	9	67	7
	III	44 -- 61	84	16	65	12
	IV	27 -- 43	63	37	29	17
	V	___ -- 26	56	44	9	7
					214	44
Otis I. Q.	I	110 -- ___	100	0	29	0
	II	99 -- 109	94	6	82	5
	III	89 -- 98	79	21	81	21
	IV	81 -- 88	63	37	19	11
	V	___ -- 80	47	53	7	8
					218	45

*Pass Group Includes Those Who Dropped Out With Passing Grades

TABLE E-3 (continued)

Definition of Groups:

I. Scores greater than $+\sigma$ of Pass Group.
II. Scores greater than Mean of Pass Group, but less than $+\sigma$, or scores greater than $+\sigma$ of Fail Group, but less than $+\sigma$ of Pass Group.
III. Scores greater than $-\sigma$ of Pass Group, but less Mean, or scores greater than Mean of Fail Group, but less than $+\sigma$
IV. Scores greater than $-\sigma$ of Fail Group, but less than Mean, or scores greater than $-\sigma$ of Fail Group, but less than $-\sigma$ of Pass Group.
V. Scores less than $-\sigma$ of Fail Group.